

**DIRECT OR INDIRECT RELATIONSHIP
BETWEEN MORPHOLOGICAL AWARENESS
AND READING COMPREHENSION:
A STUDY OF ADULT SINHALA (L1) AND
ENGLISH (L2) STUDENTS**

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The material presented in this thesis is the original work of the candidate except as acknowledged in the text, and has not been previously submitted, either in part or in whole, for a degree at this or any other University.

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Abstract

In addition to first language reading, reading in English as a second language is important to achieve academic success in education institutions that make substantial use of academic materials written in English. Reading comprehension is a challenge for children and adults due to its complexity. One of the predictors that has been argued to address this complexity is morphological awareness. Morphological awareness may provide useful information about word structure and syntactic structure in constructing meaning from written text. It may facilitate reading comprehension independent of other reading-related skills such as vocabulary knowledge. Additionally, as vocabulary in many languages, including Sinhala and English, is formed of morphemes, and morphology and vocabulary seem to have similar properties, such as meaning and use, it can be argued that morphology relates to vocabulary knowledge and then vocabulary knowledge relates to reading comprehension levels. Therefore, the current study aimed to investigate whether morphological awareness is directly related to reading comprehension or whether it is indirectly related to reading comprehension via vocabulary knowledge. This was assessed in two different languages Sinhala (L1) and English (L2) within the same group of adult students in a university in Sri Lanka. The study also investigated whether morphological awareness transfers between Sinhala and English in support of reading comprehension.

Following the adaptation, piloting and revision of 12 measures, they were given to 189 students. The measures comprised two reading comprehension tasks (Reading Comprehension Questions, which assessed passage level understanding and Reading Comprehension Cloze, which focused on sentence level), two measures of morphological awareness (a Word Structure task and a Morpho-Syntactic Structure task), and two vocabulary measures: (assessing Size of Vocabulary and Depth of Vocabulary). All measures were given in both Sinhala and English;

though further analyses questioned the validity of the passage level Sinhala reading comprehension measure, which was then not included in further analyses. A questionnaire was also employed to obtain background details of the participants.

The results indicated significant correlations between the measures of morphology and vocabulary and the reading comprehension measures. They also suggested relationships between Sinhala morphological awareness and English reading comprehension (Cloze and Questions), and between English morphological awareness and Sinhala reading comprehension (Cloze). Furthermore, regression analyses indicated that L1 morphological awareness directly and indirectly, via vocabulary knowledge, contributed to L1 reading comprehension but L2 morphological awareness contributed primarily indirectly, via vocabulary knowledge, to L2 reading comprehension. The cross-language results demonstrated that, after controlling for English morphological awareness, the addition of Sinhala morphological awareness scores predicted extra variability in English reading comprehension at the sentence level, but not at the passage level. Also, English morphological awareness scores did not influence the level of prediction of Sinhala reading comprehension after controlling for Sinhala morphological awareness.

These results demonstrated that morphological awareness and vocabulary made unique contributions to reading comprehension but that the contribution of morphological awareness to reading comprehension varied across L1 (Sinhala) and L2 (English). These findings have both theoretical and practical implications, which are discussed in this thesis.

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CHAPTER ONE

GENERAL INTRODUCTION AND OVERVIEW OF THE THESIS/RESEARCH

1.1. Introduction

This introductory chapter focuses on the background to the research. The details presented in this chapter are to provide an overall understanding of the research context on the association between morphological awareness and reading comprehension, the relationship between morphological awareness and vocabulary knowledge, and the cross-linguistic relationships between morphological awareness and reading comprehension in Sinhala and English.

1.2. Background to the Research

Reading is an important skill required in many aspects of today's globalised society. The ultimate goal of reading is constructing meaning from written texts. In the process of constructing meaning, the reader must be able to understand the information encoded in words. Wang, Perfetti Charles, and Liu (2005) claim that reading is transforming the graphic symbols of the language (writing system) into verbal (conceptual) information (word and morphemes) (see also, Koda, 2007, for similar statements about reading). Reading in the first, second, or additional language is an intricate process (Snow, 2002a; Wurr, 2003), and the demands of reading continue as individuals progress through education (Donald, 2002; Shanahan, 2009). As a result, understanding written texts is a challenge for children as well as adults.

The ability to receive meaning from written text is an important skill (Tighe & Binder, 2015). In terms of education, one of the challenges that students face is reading comprehension. This may be particularly the case in tertiary education because the texts that an individual may be required to read to complete their courses are likely to be cognitively and linguistically challenging (Cogmen & Saracaloglu, 2009), and the students have to reach their academic goals through autonomous reading and learning (Donald, 2002; Halpern, 1998). Such tertiary-level students are expected to deal with a text-based learning setting (Pawan & Honeyford, 2009). Those who experience difficulties in generating meaning from written text may face many difficulties in gaining access to information (McShane, 2005). When access to information becomes difficult, it is likely to affect the success of the students' studies. Therefore, reading comprehension in higher education is crucial for educational achievement (Burrell, Tao, Simpson, & Mendez-Berrueta, 1997; Caverly, Nicholson, & Radcliffe, 2004; Simpson & Nist, 2000; Sparks & Lovett, 2009): without the ability to comprehend written text, the goals of learning are unlikely to be reached. If the students cannot comprehend books and materials effectively in educational settings, there is a high chance of academic failure (Lipka & Siegel, 2012).

To achieve academic success, in addition to comprehending written texts in the first language, comprehending texts in English as a second language is vital in academic institutions that make use of considerable educational materials written in English. In such contexts, English reading comprehension is a particularly necessary skill for successful academic performance of secondary students in later grades (Eason & Cutting, 2009) and, especially, in higher education (Carrell, Devine, & Eskey, 1988). In academic settings, where English is the mode of teaching and learning, students cannot achieve the expected goals without English reading proficiency. As a result, English (as a second/additional language) programs in many academic settings are given considerable attention, particularly where reading comprehension in English is important

for academic studies and professional success (Grabe & Stoller, 2013). English has become the mode of instruction in educational institutions (e.g., colleges and universities) in many countries (e.g., India, Nepal, Bangladesh, Pakistan etc.). English is also taught in Sri Lanka, which is the setting of this research, as a second language (ESL). Thus, at least in Sri Lanka, second language reading comprehension is one of the factors which should be considered in the process of developing English proficiency as it will support the student to reach their desired educational attainments.

In reading research literature, it is highlighted that morphological awareness may facilitate the processing of words, syntax, and semantics while constructing meaning from written texts (Carlisle, 2000; Choi, 2015; Goodwin, Huggins, Carlo, August, & Calderon, 2013; Kirby et al., 2012; Ku & Anderson, 2003; Wang, Cheng, & Chen, 2006). Hence, it can be argued that morphemes can provide readers with additional understanding of the writing system they are learning, as well as useful information about word structure and syntactic structure (Kuo & Anderson, 2006). In a language, the smallest meaningful unit is the ‘morpheme’ (Bloomfield, 1933). Therefore, in the process of constructing meaning, morphemes may play an important role. Morphemes contain word structure properties (e.g., “happy + ness” “happiness” or “independent + ly” “independently”) and syntactic structure properties (e.g., adding “er” to “write” creates “writer”, from verb to a noun). The ability to manipulate these structures may allow the reader to construct meaning from written text. Better readers may be able to recognize minimal meaningful units and analyse the syntactic structure of the phrases, the clauses and the sentences in constructing meaning. Morphological awareness may help the reader to interpret the linguistic elements such as word structure and syntactic structure encoded in words and construct meaning independent of other reading-related skills such as vocabulary. As such, morphological awareness may directly contribute to reading comprehension. Therefore, one of the approaches that scholars have identified to facilitate learners’ L2 reading comprehension is

the use of morphological awareness training (Dongbo & Koda, 2012; Qian, 1999; Wade-Woolley & Geva, 1999; Wang et al., 2006). Such research has led to a range of studies and theories related to the role of morphological awareness in supporting reading comprehension (see Bowers, Kirby, & Deacon, 2010a; Dongbo & Koda, 2012; Goodwin et al., 2013; Kirby et al., 2012; Singson, Mahony, & Mann, 2000; Wade-Woolley & Geva, 1999; Wang et al., 2006). This thesis aims to support the development of such knowledge by investigating the relationship between morphological awareness and reading comprehension among Sinhala first language students who learn English as a second language. It is hard to find research on the development of these students' language and reading. Therefore, extending empirical evidence to Sinhala-speaking English language learners is important for future educational studies.

In the literature (as will be discussed in chapter 2, section 2.5), it has been suggested that, in addition to reading comprehension, morphological awareness is also related to vocabulary knowledge (Anderson & Freebody, 1982; Anglin, Miller, & Wakefield, 1993; Carlisle, 2003). It has also been suggested that vocabulary knowledge is associated with reading comprehension (Kieffer & Lesaux, 2012a; Qian, 1999; Nagy, Berninger, & Abbott, 2006). Therefore, it can be argued that morphological awareness may indirectly relate to reading comprehension via vocabulary knowledge.

As discussed in Chapter 2, in the existing literature, adequate evidence has not been provided to determine whether morphological awareness directly contributes to reading comprehension or indirectly contributes to reading comprehension. While some researchers argue that morphological awareness directly contributes to reading comprehension with the help of semantic and syntactic information encoded in morphologically complex words (Carlisle, 2000; Goodwin et al., 2013; Kieffer, Biancarosa, & Mancilla-Martinez, 2013; Kieffer & Lesaux, 2012a; Mahony, Singson, & Mann, 2000; Nagy, 2007; Wang et al., 2006), other researchers argue that morphological awareness facilitates the creation of new words and the

development of vocabulary knowledge, which in turn facilitates successful reading comprehension (Anglin et al., 1993; Dongbo & Koda, 2012; Kuo & Anderson, 2006; Qian, 1999). The direct and indirect relationships have to be untangled to provide a clear understanding of the relationship between morphological awareness and reading comprehension. A clear picture of this relationship will be helpful in the development of theories of reading comprehension across languages and language contexts (i.e., L1 and L2) as well as in the development of improved pedagogical practice. Therefore, this study aims to examine whether morphological awareness directly predicts reading comprehension or indirectly predicts reading comprehension via vocabulary knowledge.

Morphological awareness is considered to show a relationship with reading comprehension across different languages (Ramirez, Chen, Geva, & Kiefer, 2010; Saiegh-Haddad & Geva, 2008a). It is argued that cross-linguistic morphological awareness transfer may support L2 reading comprehension (Kuo & Anderson, 2006; Ramirez et al., 2010; Wang et al., 2006). In the relevant literature, though studies of morphological awareness transfer are relatively rare (Ramirez et al., 2010; Saiegh-Haddad & Geva, 2008a; Schiff & Calif, 2007), there is empirical evidence of cross-linguistic morphological awareness transfer between different languages: such as English and Spanish with similar morphological structures; and English and Hebrew or English and Arabic with noticeably different morphological structures. Both Spanish and English belong to the Indo-European family of languages that use the same Latin alphabet for writing and share both the roots and affixes of Latin and Greek origin. As a result, orthographic and phonological similarities exist in Spanish and English (e.g., -ci'on in informaci'on (Spanish) and -tion in information (English) (Hancin-Bhatt & Nagy, 1994). Additionally, morphological structures are similar in both languages. Words in both languages share morphological rules and structural similarities in their derivational morphology (e.g., the English word 'information' shows a great deal of similarity with the structure of informaci'on

from Spanish; and unusual from English is similar in structure to unusual from Spanish). Therefore, in terms of morphological structure, and aspects of meaning that can be derived from morphological structure, there is a reasonable high level of relationship between English and Spanish (Ramirez, Chen, & Pasquarella, 2013). On the other hand, Hebrew and Arabic are Semitic languages in which affixes are indicated by the consonants and vowels within the word under the principle known as root and pattern morphology. In these languages, most words are composed of a root and a pattern. “The root, which usually consists of three consonants, carries the main semantic meaning, whereas the word pattern carries mostly grammatical derivational information” (Shahar-Ymes, Eviatar, & Prior, 2018, p. 4). In these languages, analysis of roots and patterns explains the internal structure of words (e.g., in Hebrew, /z m r/ = ‘sing’ (**zemer**) ‘song’ (**tizmoret**) ‘orchestra’ (**zamar**) ‘singer’) (see Frost, 2009, and Oganyan, 2017). The structure of Arabic is very similar to that of Hebrew in that morphemes are not added one onto another in these languages (Oganyan, 2017). In English, morphemes are formed in a linear manner: e.g., in the word ‘farmers’ the ‘-s’ is added to ‘farmer’ to add to the meaning of the base word. Although in Hebrew and Arabic most ‘roots’ are made up of three consonants that are not free morphemes, in English and Spanish ‘roots’ are made up whole words of varying length and are typically seen as free morphemes. However, cross-language morphological transfer to reading comprehension is far from clear (see Chapter 2, sub-section 2.8.1) and, therefore, further investigations are needed. Even though studies investigating morphological awareness transfer have concentrated on bilingual early grade learners (Deacon, Wade-Woolley, & Kirby, 2007; Schiff & Calif, 2007) and late primary and middle school year learners (Ramirez et al., 2010), it appears that no study has so far investigated the cross-linguistic relationship between morphological awareness and reading comprehension among bilingual adult students. Further research on morphological awareness transfer across different languages would therefore be useful in order to determine the conditions such as the similar or

different morphological structures and language learning contexts L1 and L2, under which such transfer may occur. Moreover, as the findings will directly address the Sinhala learners of English in Sri Lanka, this study examines whether morphological awareness transfers between Sinhala and English, in order to assess its impact on Sinhala adult learners' effort to learn English. As Sinhala is an Indo-Aryan language, the findings enrich the field of research on cross-linguistic transfer of morphological awareness by addressing issues pertaining to learners from new language communities.

Overall, the current research aims to investigate direct and indirect relationship between morphological awareness and reading comprehension in two languages: Sinhala (L1) and English (L2). This study also investigates whether morphological awareness transfers between the Sinhala language and the English language and supports reading comprehension among Sinhala-speaking English language learners. Given that morphology is associated with vocabulary and that vocabulary level predicts the level of reading comprehension, the study also assesses vocabulary knowledge with to confirm that morphological awareness is associated with vocabulary knowledge and then ascertain whether morphological awareness is related with reading comprehension via vocabulary (i.e., an indirect association) or not (evidence for a more direct association).

1.3. The Significance of the Present Study

While there are many components that can be considered within the language teaching and learning process, the current study focuses on reading comprehension because it is so critical to success in tertiary level educational settings. Carrell et al. (1988) state that reading comprehension is dominant in the second language teaching/learning process for educational purposes particularly in higher educational institutions that make substantial use of academic material written in English. This study attempts to demonstrate the correlation between

morphological awareness and reading comprehension, and the contribution of cross-linguistic morphological awareness to reading comprehension between Sinhala and English among Sinhala-speaking English language learners. The study contributes to the reading literature on the potential value of morphological awareness in teaching languages to tertiary level bilinguals and in the process of developing reading comprehension. Furthermore, the findings may be useful for future research in similar areas, including future plans targeting the use of morphological awareness in teaching reading comprehension skills in both L1 and L2. Although the context of this investigation emphasizes Sinhala and English, the outcomes of this study are not limited to application in Sri Lanka. They can be applied to both L1 and L2 classrooms in different settings where there are challenges with the development of language proficiency, in general, and of reading comprehension, in particular.

1.4. Assessment Battery

Twelve measures were developed (explained in detail in Chapter 3) to investigate the effects of morphological awareness on the reading comprehension of a group of Sinhala-speaking English language learners in Sri Lanka. The tests measure reading comprehension levels, morphological awareness and vocabulary knowledge in the English language and in the Sinhala language.

The present study used the following measures: the Reading Comprehension Questions (open-ended questions) and the Reading Comprehension Cloze (Sentence Completion Task), which were considered as investigative of text reading comprehension skill; a Word Structure Test (to determine if the second word comes from the first word and has a similar meaning) and a Morpho-Syntactic Structure Test (to circle the word from four possible choices which grammatically fits in the blanks of each sentence) which were considered indicative of morphological awareness at the word level and at the syntactic level; a Size of Vocabulary Test

(to match the three definitions with three of the six words on the left) and a Depth of Vocabulary Knowledge Task (to select four words out of eight words that are most relevant to the stimulus word) which assessed the vocabulary size and the depth of vocabulary knowledge.

In addition, a questionnaire containing demographic (gender, age) and language-background (language experience, environment) questions were administered to all the participants in order to obtain demographic information of the participants.

The researcher adopted and developed the measures for the purpose of this study. Prior to the main study, the entire battery was piloted with small groups of students to examine the appropriateness (consistency and ability) of the tests (see Chapter 3).

1.5. Thesis Structure

This thesis consists of five chapters. Each of these is summarised below.

Chapter 2: Literature Review provides evidence on general theories and models of reading comprehension derived from pertinent research literature to postulate a theoretical framework for the present research. This chapter explores potential associations between morphological awareness and reading comprehension but also focuses on the relationship between vocabulary knowledge and reading comprehension. In addition, this chapter provides evidence from the pertinent literature on first language transfer in the process of developing a second language.

Chapter 3: Developing Measures and Pilot Work discusses the development of the measures used in this study. The assessment battery, which comprises 12 subtests in the two languages (i.e., Sinhala and English), is discussed in terms of evidence for the reliability of the tests, as indicated by pilot studies. Example items for each measure are discussed in order to give a clear picture of the measures used in this study. In addition, a questionnaire, written in both Sinhala and English, is discussed in this chapter.

Chapter 4: The Methodology and Results Chapter provides details of the participants, materials, procedures, data collection and data analyses used for the current study. Further, this chapter presents the statistical findings, which answer for the research questions.

Chapter 5: General Discussion interprets the results that are presented in chapter 4. Finally, this chapter draws attention to the implications for training/exercises, limitations of the research and routes for future investigations.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

The ultimate goal of reading is considered comprehension that transcends mere recognition of words and sentences (Nation, 2005; Paris, Hamilton, Israel, & Duffy, 2009). Reading is one of the most important skills for people to acquire in today's modern globalised society. The ability to decode the written word and receive meaning from written text is a daily requirement in education, employment, and other basic purposes of life (cultural, social). Readers are required to process words, sentences and passages in order to construct meaning from the texts. They need to interpret words in the texts and get the meaning from texts by using the awareness of the linguistic structures (word and sentence). However, comprehension is not limited to recognizing words and sentences. It is a complex, multi-component process (Snow, 2002b) which comprises active interactions between the reader and, the text (Van Den Broek & Kremer, 2000). It is a conscious process or intentional practice (Yang, 2006) in which the reader interacts with the text (Harris & Hodges, 1995) or interacts with thought and language (Goodman, 1970) and governs his/her consciousness of linguistic skills such as phonological skills, morphological skills, syntactic skills, semantic skills, grammatical structure, vocabulary knowledge, etc to construct meaning from written texts.

As a result of the nature of this complexity, first language (L1) readers as well as second language (L2) readers experience difficulties in generating meaning from written text. In the past few decades, researchers (Carlisle, 2000; Choi, 2015; Clarke, 1988; Coady, 1979; Diana, 1994; Gough & Tunmer, 1986; Kieffer & Lesaux, 2012a; Kirby et al., 2012; Saiegh-Haddad & Geva, 2008b) have empirically established insights into the nature and the mechanisms of

reading comprehension development of L1 learners as well as L2 learners (both children and adults). In addition, due to the complexity of reading comprehension, diverse theoretical evidence on reading comprehension has been provided in reading literature to provide a better understanding of the processes involved in reading comprehension.

Previous reading literature suggests numerous skills and capabilities such as fluency, semantic skills, phonological skills, memory-processing skills, vocabulary, inference generation, grammatical structure, prior knowledge, and verbal ability that account for reading comprehension. Among the different skills involved in the process of reading comprehension, morphological awareness has been identified as one of the skills in L1 and in L2 reading comprehension (Carlisle, 2000; Choi, 2015; Curinga, 2014; Dongbo & Koda, 2012, 2013; Guo, Roehrig, & Williams, 2011b; Haomin & Koda, 2018; Jeon, 2011; Mahony et al., 2000; Wilson-Fowler & Apel, 2015).

As there has not been sufficient research on the relationship between morphological awareness and reading comprehension within language and across-languages: L1 (Sinhala) and L2 (English) – the present research attempts specifically to investigate impact of such relationship in deriving meaning out of a text either in the reader's L1 or L2, along with the variations one experiences in the status of the language concerned. This chapter outlines the literature supporting the research presented in this thesis. First, it discusses the models of the reading comprehension processes, which provide some background on how researchers deal with the complexity of reading comprehension, and offer a better understanding of the processes involved in reading comprehension. Then, this chapter provides evidence from the literature relevant to the field of reading comprehension in general and morphological awareness and its relationship to reading comprehension in particular. Here, the studies that have been conducted in relation to L1 and L2 morphological awareness and L1 and L2 reading comprehension are reviewed. Given that morphological awareness indirectly contributes to reading

comprehension via vocabulary knowledge, this chapter also highlights morphological awareness on reading comprehension with the focus on the relationship between morphological awareness, vocabulary knowledge and reading comprehension. This chapter also attempts to explore models of cross-linguistic skills, and studies on the cross-linguistic contribution of morphological awareness to reading comprehension in L1 and L2 because this study investigates the effects between the two languages. The final segment of this chapter discusses the rationale for conducting this specific research on the relationship between morphological awareness and reading comprehension in L1 (Sinhala) and L2 (English) with evidence derived from a body of relevant literature.

From the introduction to the present thesis in Chapter 1 it must have been clear by now that this study is on the whole an attempt to develop the premise that morphological awareness is important in achieving proficiency in reading comprehension. In order to extrapolate this premise in the Literature Review, theoretical support has been drawn from robust experimental research in reading comprehension. Here follows a theoretical survey of a series of reading comprehension models that demonstrate on the basis of tangible evidence that L1 and L2 morphological awareness has a positive impact on the readers of texts that are of L1 and L2 significance for them, with a view to derive theoretical support for the premise that this thesis is concerned with. The vast body of research carried out in various advanced educational settings has led to the formulation of various models of reading comprehension and in this chapter a series of such models are studied in order to witness how L1 and L2 morphological awareness becomes respectively active in reading comprehension endeavours made by learners of different age levels and cognitive levels. In this concern the literature survey continues in a procedure relating to

- Models of reading comprehension
- Models of cross-linguistic skills transfer in reading comprehension
- Morphological awareness, vocabulary knowledge, and reading comprehension
- Research on L1/L2 morphological awareness and L1/L2 reading comprehension
- Cross-linguistic transfer of morphological awareness
- Research on cross-linguistic morphological awareness transfer in L1/L2 reading
- The Sinhala language, orthography, and morphology
- Conclusions leading to the current study

2.2. Models of Reading Comprehension

Receiving meaning is the ultimate purpose of reading. The evidence of previous research indicates that reading comprehension is a complex, multifaceted process which consists of information from lexical features to world knowledge (Snowling & Hulme, 2011) or which consists of the reader, the text, and the factors associated with the activity of reading (Lipka & Siegel, 2012). It is more than a simple matter of recognizing or understanding individual words. Readers are required to be aware of language elements such as letters, sounds, word structures, sentence structures as well as metacognitive abilities in the process of reading comprehension. Thus, reading comprehension is a complex process of “simultaneously extracting and constructing meaning through interaction and involvement with written language” (Snow, 2002b, p. 11). Therefore, the process involved in reading comprehension cannot be directly observed (Pearson, 2009).

As a result of the complexity in reading comprehension, many theoretical models of reading comprehension such as Interactive Models, Stage Models, Constructionist Models, the Simple View of Reading, the Component Models of Reading, The Reading Universal Hypothesis, Interdependence Hypothesis, and The Language Threshold Hypothesis have been proposed to

elucidate the processes involved in reading comprehension in the past few decades. Each model and hypothesis aims to provide insights into the processes and components involved in the reading comprehension process. They explain how external and internal factors relate to reading comprehension. They not only provide an explanation of the process of reading comprehension, but they portray the contributory components required to gain a proficiency level in reading comprehension.

Thus, researchers have given different views on reading comprehension from the perspective of first language (L1) and that of second language (L2) respectively. First, these views are modelled as the process and componential models and later they are modelled as the ‘bottom-up’, ‘top-down’ and ‘interactive models’. In addition to these models, hypotheses such as ‘The Language Independent Hypothesis’ and ‘The Language Threshold Hypothesis’ are proposed to explain the complexities pertaining to reading comprehension. These models and hypotheses provide evidence on the relationship between the reader’s behaviour and the text in the process of reading comprehension. Therefore, an overview of the models ‘bottom-up’(Gough, 1972; LaBerge & Samuels, 1974; Zainal, 2003), ‘top-down’ (Goodman, 1988; Smith, 1975) and ‘interactive’(Kim & Goetz, 1994; Rumelhart, 1994; Stanovich, 1980), and ‘the language independent hypotheses’(Jim, 1991), ‘the language threshold hypotheses’(Clarke, 1988) is given in the first part of this chapter in order to provide evidence on reading comprehension. In addition, the Contrastive Analysis Hypothesis (Dulay, Burt, & Krashen, 1982; Jim, 1991; Talebi, 2014) which introduced the concept of transfer, is discussed in this chapter.

2.2.1. Interactive Models of Reading Comprehension

Research in other areas such as psychology, and particularly cognitive psychology have influenced early models of reading comprehension (Pearson, 2014). These models initially were divided into two categories (Alvermann, Unrau, & Ruddell, 2013) such as bottom-up

processing models of reading and top-down processing models of reading. The ‘bottom-up’ (or word level) models of reading were proposed focusing on the visual information exhibited by a written text. Here the reader decodes and understands words from the visual images of graphemes. The ‘top-down’ (or text level) models suggested that the reader predicts and constructs the meaning of a text through the background knowledge or prior knowledge (Langer, 1984).

However, it is argued that these models do not explain how meaning is assimilated or constructed in the process of reading comprehension (Bernhardt, 1991; Inhoff, Pollatsek, Posner, & Rayner, 1989; Weigend, Huberman, & Rumelhart, 1990) and as a result, the reader and the his/her awareness do not appear in the process. Further, it is argued that according to these models, the reader plays a passive role in reading (Rumelhart, 1994; Tunmer & Chapman, 2012). These models are rigid and therefore, they do not allow any bidirectional movement of information between the lower and the high levels of knowledge. Therefore, these models fail to explain how meaning is understood or constructed during the reading process (Bernhardt, 1991; Inhoff et al., 1989; Weigend et al., 1990). Also, these models pay attention to a single process (Rumelhart, 1994). As a result of the debate on the models, interactive processing models (Kim & Goetz, 1994; Rumelhart, 1994; Stanovich, 1980) which combine the characteristics of both ‘top-down’ and ‘bottom-up’ models were proposed to address the subtle issues of reading comprehension.

In interactive processing models (Kim & Goetz, 1994; Rumelhart, 1994; Stanovich, 1980), the reader plays an active role with knowledge of the orthographic, syntactic, semantic, lexical elements and prior knowledge in order to comprehend the text (Tunmer & Chapman, 2012). Although the bottom-up and top-down models draw on a single process, these models draw on both lower and higher level processes. These models attempt to account for the strong points of both top-down and bottom-up models proposing that the interaction between top-down and

bottom-up occur simultaneously. In this process, the reader goes back and forth to comprehend the text. Further, Rumelhart (1994) suggests that reading is a perceptual and cognitive process in which the reader combines orthographic, lexical, syntactic, semantic, and phonological knowledge to construct meaning from the text. It is suggested that the reader interacts between prior knowledge and the information in the text (Rumelhart, 1994). It is accepted that in the interaction process reader obtains both top-down and bottom-up information to comprehend a written text. Therefore, reading comprehension demands the ability of both decoding and interpreting text and readers are required to have both a proficiency level of word and that of the text to comprehend a written text. Thus, it is obvious that the reader's background knowledge interacts with his linguistic knowledge.

Many researchers express their views that reading comprehension is compensatory in nature. As a further development, Stanovich (1980) expanded the interactive model by introducing a compensatory element. Here, it is suggested that poor readers who do not have adequate knowledge of a lower level process (letter or word recognition) may depend more on higher-level contextual information. In other words, a high competency level on one skill can be compensated for a low competency level on another skill in the process of reading comprehension. When the reader suffers due to an inadequacy of skills in an area (e.g, word decoding skills) he could draw his skills stronger in another area (e.g, high level language skills) (Paris et al., 2009). Therefore, according to the interactive compensatory model, reading occurs in a compensatory way in which deficiency in one level can be compensated for at other levels. This model provides evidence to hypothesise that not only more skilled readers but also less skilled readers comprehend written texts. Hence, it can be assumed that the individual differences play a considerable role in reading. However, this model has been criticized on the basis that some skills such as oral fluency which is an important factor to be considered in reading comprehension may not be compensated for with the help of any other skill.

2.2.2. Stage Models of Reading Comprehension

Stage models of reading comprehension propose a series of phases in which individuals gain specific skills which lead to competency in reading comprehension. According to these models, individual changes occur due to biological, cultural and educational influences and comprehension skills are acquired. Furthermore, the models illustrate how and in what order comprehension skills can be acquired.

Chall's (1996) stage model which defines the process of reading comprehension in six sequential stages, is considered as a prominent stage model in the literature. Out of the six stages, the first stage deals with pre-reading skills which require the knowledge of graphemes and phonemes. The child readers start mapping letters during this stage. In the second stage, they start developing decoding skills such as letter/word recognition and letter/sound correspondence. During the third stage, sight word vocabulary is built and reading fluency increases. The children make the shift from 'learning to read', to 'reading to learn' during the fourth stage whereas during the fifth stage they focus on reading comprehension skills by reading about different views on the same subject. In this stage, they have an ability to gain knowledge of various complex concepts. The final stage (six) suggests that the reader has an ability to comprehend written texts and construct different views about the same subject matter. The model suggests that the reader acquires skills in a linear and sequential manner. The reader first acquires pre-reading skills, then decoding skills and then skills of complex text comprehension (Paris et al., 2009).

Although stage models provide useful evidence to understand the complexity of reading comprehension, they have been criticized for not considering individual differences (Snowling, Hulme, & Nation, 1997) and orthographic transparency differences among languages (Share, 1995). Also Paris et al. (2009) criticise that these models do not identify the development of

comprehension skills and explain the increasing complexity of texts. Further, it is accepted that this type of model does not explain areas such as aspects of word decoding, linguistic comprehension, vocabulary, background knowledge, and speed of reading which have been considered as contributory factors of reading comprehension.

2.2.3. Constructionist Models of Reading Comprehension

The constructionist theory proposes that text reading comprehension can be succeeded through a process at different levels (Kintsch, 1988). Constructionist models composed of both the bottom-up process and the top-down process which require two sources of information such as linguistic information and information about the world. Both sources of information are vital parts of constructing meaning in the process of reading comprehension (Kintsch, 2005). These models propose that the reader is required to decode individual words in a text and then exploit the process of perception, word recognition, and parsing (separating sentences and phrases into grammatical parts) and finally analyse words semantically in order to comprehend the word meaning (Kintsch, 1988). Further, Tunmer and Chapman (2012) propose that in the process of reading comprehension, the reader must build multilevel representations of the text (microstructure and macrostructure). Here, the reader is required to be aware of the role of the text at word level (microstructure) and the role of the word at a higher-level (macrostructure) which facilitates to comprehend global topics and their relationship. Both conceptual meanings and structures of the text interplay in the process of reading comprehension. The two levels represent the global meaning of the text. The meaning that is derived from the text or the meaning of the text as it is explicitly constructed by the text is considered as superficial comprehension of the text. The superficial comprehension of the text would not allow the reader to construct the deeper meaning of the text. Therefore, a mental model or a situational model is formed based on the content of the text or the situation described by the text. However, as this model failed to address the complexity of reading comprehension, Tunmer and

Chapman (2012) themselves developed it further, adding an integration component into the model as construction-integration (CI) model.

This model describes the relationship between top-down and bottom-up processes and it demonstrates how both processes jointly form mental representations in reading comprehension (Kintsch, 2005). The reader starts the comprehension process by decoding the text with the help of bottom-up process, and then the reader develops the situational model activating the top-down process which involves prior knowledge, vocabulary, and activation of relevant schemata (Anderson & Pearson, 1984). The bottom-up process focuses on decoding and understanding words whereas top-down process focuses on the integration with prior knowledge in understanding the text (Stanovich, 1980). This model requires both bottom-up processing (formation of an accurate text base) and top-down processing (using prior knowledge to interpret the text base and construct a situational model).

According to this model, propositions are constructed based on the words in the text and, then the problems related to the comprehension process are solved by an integration process. The reader develops a literal text model as well as a situational model at the same time with the merging of the two forming the integration component. When the reader constructs meaning from the text to produce a system which comprises of mental concepts, the reader must integrate the concepts from this system that are related to the situational model. And at the same time the concepts which are not compatible with the implied situation are de-activated. Once the two models are activated consistently, the reader controls ambiguities and contradictions and produce a solid comprehension from the text (Paris et al., 2009).

The construction-integration model is mostly considered as an adult reading comprehension process (Paris et al., 2009). This model fails to make clear how children develop skills that are essential to construct text-based and situational models. Also, this model does not indicate how

the readers integrate their prior knowledge with the constructed representation. On top of all that, although this model deals with the end product of reading comprehension, it fails to address the core component skills required for the process of reading comprehension. As a result, it is difficult to recognize the necessary component skills that contribute to the reading comprehension process. Without recognizing the required component skills for the reading comprehension process, it is difficult to deal with the difficulties faced in this process.

While some researchers aim at modelling the process of reading comprehension as a holistic construct, some researchers (Gough & Tunmer, 1986; Hoover & Gough, 1990) aim at modelling the process of reading as a componential construct involving two or more constituent components. The transition from holistic construct to componential construct was first marked by the model known as the Simple View of Reading (Gough & Tunmer, 1986). The componential models deal with different components involved in the reading comprehension process. The next section discusses some of these models proposed by the researchers in the literature in order to provide a general understanding of the process of reading comprehension.

2.2.4. The Simple View of Reading

The model ‘The Simple View of Reading (SVR)’ (Gough & Tunmer, 1986; Hoover & Gough, 1990) proposes a simple process to address the complexity of reading comprehension. This model states that successful reading comprises two components: decoding and linguistic comprehension. In the process of decoding, the reader recognises the printed words which comprise phonology and morphology that are needed to derive word meanings from print representations. This model proposes that visual phonological and visual morphological mapping skills are essential to grasp the word meanings from the text effectively in the process of reading. The other process is linguistic comprehension which refers to the ability to understand language elements such as vocabulary, syntax, semantics, and pragmatics.

Both decoding (D) and linguistic comprehension (L) are essential in reading comprehension (R). The equation ' $R = D \times L$ ' suggests an adequate ability of recognising words and understanding language in the text is required to comprehend a written text productively. In this process, the reader should be able to read printed words without the assistance of the text and understanding the language (Adlof, Catts, & Little, 2006). This model identifies that reading comprehension fails due to weak recognition of words, inadequate linguistic skills or both (Hoover & Gough, 1990). While linguistic comprehension is defined as "the process by which the given lexical (i.e., word) information, sentences and discourses are interpreted" (p. 7), decoding is defined as interpreting isolated words quickly, accurately, and silently (Gough & Tunmer, 1986). Therefore, all the variances which are accounted for reading comprehension can be measured by the proper measurement of decoding skills (letter-sound correspondence or letter knowledge, phonemic awareness and spelling) and linguistic skills (phonological, morphological, syntactic, semantic, etc.).

Researchers have laid considerable emphasis on this model (SVR) and tried to add separate components to this model. Adlof et al. (2006) tried to add a fluency component to the Simple View of Reading by administering reading and language measures to 604 children in second, fourth and eighth grades. The results demonstrated that the fluency component did not provide unique contribution to reading comprehension. However, studies suggest that the contribution of components change during the course of reading development (Catts & Kamhi, 2005). It is argued that while in early grades reading comprehension mostly depends on word recognition skills, in later grades (Grade 8) it mostly depends on linguistic comprehension (Catts, Adlof, Hogan, & Weismer, 2005). This argument can be clearly understood with the empirical evidence provided by Landi (2010) based on the study of over 900 university students. This study reports that relative to linguistic comprehension, word decoding skills provide a much weaker contribution to reading comprehension among an adult population.

However, this model has been criticized as it does not explain many variables such as vocabulary knowledge, motivation, and the cultural background of the reader that are considered to be contributory factors in reading comprehension. The two components: decoding and linguistic comprehension are not broken into constituent skills and investigate the interactions of these skills with the additional variables are investigated (Aaron, Joshi, Gooden, & Bentum, 2008). Although the model provides evidence that the reading process comprises of independent components such as decoding and comprehension, the nature of their behaviour during the reading process is unclear. As this model indicates some weaknesses, researchers (Joshi & Aaron, 2000; Tunmer & Chapman, 2012) have proposed some other models such as the Component Model of Reading (CMR) in order to address the issues of the model 'the Simple View of Reading'. The next segment discusses how component model of reading attempts to address the complexity of reading comprehension.

2.2.5. The Component Model of Reading

The 'Component Model of Reading (CMR)' was inspired by the simple view of reading model and Joshi and Aaron (2000) designed this component model by adding speed of letter naming to the simple view of reading. Speed is used in the CMR in order to see whether it supports the model as an independent component skill. To provide empirical evidence, they selected 40 children from grade 3 and assessed their skills in listening comprehension skill and decoding. The results demonstrated that simple view of reading accounted for a 48% of variance in reading comprehension. Then, a certain degree of processing speed was added to the study to see if this component would explain further variance or enhance prediction of reading comprehension. The data showed that this component demonstrated an additional 10% of the variance. Therefore, it was reported that adding this component to the simple view of reading improved the prediction aspect in reading comprehension. As a result, the revised formula was

suggested as $R = D \times C + S$ (reading comprehension=decoding x linguistic comprehension + speed).

Although the speed of processing explains additional variance, it was not considered to be entirely independent of word decoding skill. It is suggested that sight word reading is built on the foundation of decoding skills (Aaron et al., 1999). Also, they reported that speed only emerged as an important factor in children (approximately grade 4) and until then they mostly depend on word decoding. When decoding skills and speed are amalgamated, sight word reading skill, which considered as a speeded up decoding process emerges as a prominent factor (Joshi & Aaron, 2000).

An updated version of CMR was proposed to help with the judgement and remediation of reading difficulties (Aaron et al., 2008). This model categorized various components that influence reading skills into three domains: cognitive, psychological and ecological. Here, Aron, Joshi, Gooden, and Bentum attempted to identify reading disabilities in a group of school children (204) from grade 2 to 5. They designed this study to test the validity of cognitive domain (cognitive components) of the CMR. In this study, reading comprehension, listening comprehension, word decoding, and processing speed of letter naming were administered to the children. The results showed that decoding and listening comprehension accounted for between 37% and 41% of the variance in reading comprehension and increased gradually from Grade 2 through 5. Also, speed of processing accounted for a further 11% in children of grade 2. However, the variance accounted for the speed of processing declined from 11% to 2.5% from grade 2 through 5.

Standardized tests were used to assess word recognition accuracy, fluency, listening comprehension, and reading comprehension. This study investigated if a separate fluency component could be added to the Simple view of reading. However, data of this study

suggested that fluency did not play a significant unique role in reading comprehension. It does not provide independent contribution to reading comprehension separate from word recognition accuracy. Therefore, it is difficult to separate fluency from word recognition (Aaron et al., 2008).

In this study, it was concluded that readers who have good word recognition skills (sight word reading) become fluent readers and on the other hand fluent readers tend to have good word recognition skills. Therefore, speed of processing is not an independent component of word recognition skill. Further, the findings demonstrated that when children come to grade 5, they reach a level of proficiency in identifying written words. However, as the contribution of speed of processing diminished with age, it was highlighted that this may not contribute significantly to reading comprehension within the adult cohort.

A component model of reading (Mellard & Fall, 2012) was proposed for adults with low literacy skills. This model was composed of word skills, language comprehension, memory, and fluency. Three hundred and twelve (312) adult participants were recruited for the study. Adult participants were recruited for the study. This group consisted of individuals who were following basic and secondary education programs. The results indicated that these four composite variables accounted for 75% of the variance in reading comprehension. However, the study demonstrated that the adult readers with the lowest level relied mostly on word reading skills less importantly on memory, and readers with mid-level skills relied on word reading skills and memory integrating language comprehension skills. Adult readers with the highest level of reading skill showed a balance contributions from each of the four components to the reading comprehension. Although this model is considered as one of the initial models which precisely dealt with the issues of adults' reading comprehension, how adult readers make the transitions from low to mid and mid to high levels of reading ability is not clear.

Using data from 174 adult participants, (Mellard, Fall, & Woods, 2010) conducted a path analysis of reading comprehension in order to investigate if a model describes comprehension ability among adult with low levels of literacy. These participants were reading at a level equal to approximately fifth-grade. The findings indicated that these adults relied on word reading ability to comprehend written text. Also, it was demonstrated that these participants did not acquire required ability and strategies in order to integrate the words reading skills with vocabulary knowledge and language comprehension skills in the process of reading comprehension (Mellard et al., 2010). They determined that this model, and other extant models of reading comprehension do not precisely explain the skills of this population. Therefore, adults should be required high level of language comprehension ability to comprehend texts. In addition, they pointed out that in this study the strategies (higher level language skills) were appeared to be slightly used by the adult population with low levels of literacy skill. As a result, these two studies (Mellard & Fall, 2012; Mellard et al., 2010) concluded that these two models were not suitable for adults with higher reading ability.

However, the studies with the adult population commonly suggested that the components: word decoding and linguistic comprehension accounted for (anything) from 34% (Macaruso & Shankweiler, 2010), to 47% (Landi, 2010), 62.5% (Sabatini, Sawaki, Shore, & Scarborough, 2010) in reading comprehension depending on the population and assessments used. In addition it was demonstrated that these two components independently contributed to reading comprehension within the adult population (Sabatini et al., 2010; Savage, 2006). Also, it is highlighted that adult readers have a fully developed language, cognitive structure as well as good reading knowledge (Bernhardt & Kamil, 1995).

2.2.6. Summary of Reading Comprehension Models.

With the help of empirical evidence, different theories and models have been established in order to address the complexity of reading comprehension. Although these theories and models emphasize several different components (e.g., decoding, linguistic comprehension, vocabulary knowledge, speed of reading, background knowledge) of reading comprehension process, researchers (e.g., Aaron et al., 2008; Adlof et al., 2006; Cromley & Azevedo, 2007; Joshi & Aaron, 2000; Tunmer & Chapman, 2012) commonly agree that the two components: word decoding which refers to the ability to read printed words, and linguistic comprehension which refers to the ability to understand language elements (vocabulary, syntax, semantics, and pragmatics) provide the necessary linguistic information about reading comprehension. As the models outlined above commonly propose that the linguistic information provided in the above is accounted for reading comprehension, they are applied in this research as the theoretical foundation for a better understanding of reading comprehension processes.

2.2.7. Models and Theories in a Second Language and cross-linguistic transfer in reading comprehension

This section of the chapter describes the models developed to explain second language reading as the participants in the research are learners of English as a second language. These models explain the complexities involved in L2 reading comprehension and provide evidence to determine whether the L2 reading is influenced by the reader's L1 reading elements.

The L2 reading researchers focus on the question whether 'second language reading is a language problem or a reading problem' (Alderson, 1984). As a result, component models (Bernhardt, 1991; Coady, 1979) have been proposed to discuss the issues related to second language reading comprehension. However, these componential models are criticised as they do not focus on the influence of individual's L1 reading skills on L2 reading comprehension.

Therefore, it is difficult to understand whether the complexity of L2 reading comprehension occurs due to a reading problem or a language problem (Alderson, 1984). As a result, the two contrasting hypothesis: The Linguistic Threshold hypothesis and Linguistic Independence hypothesis are proposed in order to explain the complexity of L2 reading comprehension. These two hypotheses focus on the individuals' L1 reading skills that are concerned with their L2 reading comprehension.

According to the Linguistic Common Underline Proficiency Theory (Cummins, 1981), which considers both the Interdependence Hypothesis and Linguistics Threshold Hypothesis (Clarke, 1980), the readers' L2 ability is required to reach the level of L2 knowledge (i.e., vocabulary, grammar and discourse), known as the threshold level, so that the readers would be able to transfer their reading skills from L1 to L2. On the other hand, insufficient knowledge of L2 may hinder the L1 readers' effort to apply reading skills in L2. Therefore, language competence seems to have an important effect on readers. The linguistic threshold hypothesis points out that the reader strategically handles the difficulties in reading comprehension '...the good reader's system causing him/her to revert to poor reader strategies when confronted with a difficult or confusing task in the second language' (Clarke, 1980, p. 206). Clarke (1988) claims that, according this hypothesis, second language readers require a certain level of second language linguistic skills in the process of second language reading comprehension. Horiba (1996) points out that although good readers depend on semantic cues more than syntactic cues in the process of L1 reading, they rely more on syntactic cues in the process of L2 reading. This hypothesis emphasises that language plays a key role in reading comprehension. Therefore, it is assumed that the difficulty in reading in L2 may be a language problem rather than a reading problem.

However, Jim (1991) opposes this premise in his linguistic interdependence hypothesis that explains the readers' dependence on the same reading skills when they read in both L1 and L2.

In other words, L2 reading ability largely depends on L1 reading ability. In this context, Bernhardt and Kamil (1995) state that first language reading skills and second language reading skills are interdependent and L1 reading skills influence on L2 reading skills (Zainal, 2003). This hypothesis highlights that second language skills are only different at a surface level but at a deep level or fundamental level they are interdependent or the same. When an individual learns the fundamental concepts of language and uses them, they transfer across languages. Lee and Musumeci (1988) suggest that when the readers have adequate knowledge of reading comprehension skills, they may use them in second language reading comprehension. Thus, L2 learners are able to benefit from language ability either in L1 or in L2, or both, as literacy skills are common or interdependent across languages. Cummins (1998) argues that the children's skills in one language will transfer to another language (L2) when they have sufficient L2 competency. Further, Cummins (1998) stated that "transfer is more likely to occur from minority to majority language because of the greater exposure to literacy in the majority language outside of school and the strong social pressure to learn it". The important condition proposed for transfer from one language to another is that the learner should have sufficient exposure to the majority language.

The Reading Universal Hypothesis developed by Goodman (1976) proposes that the process of reading comprehension is much the same in all languages with subtle variations in specific characteristics of the writing systems and the grammatical structures particular to each. Goodman claims that the reader's knowledge of graphic and phonological systems, syntactic knowledge to comprehend the structure of phrases and sentences and semantic understanding of the text are vital in the process of individuals' reading comprehension. Consistent with this view, Tang (1997) having examined the associations between the reading processes in L1 and L2 with a group of Chinese-speaking (L1) English (L2) language learners reveals that the learners use similar reading strategies (e.g., focusing on vocabulary, summarising, relating to

prior sentences, using grammatical structure, reading on, raising questions and looking for answers in the text, looking for the main ideas, relating to prior knowledge, borrowing words from another language, skimming or scanning etc.,) to generate the meaning from the written texts in L1 and L2. It can be argued that reading skills acquired in L1 could be used in reading in another language and as a result reading is a universal process (Goodman,1976).

The component models (outlined in the sub-section 2.2) propose that different components such as decoding, linguistic comprehension, vocabulary may influence reading comprehension. However, in the last few decades, morphological awareness has been identified as one of the predictors that may influence L1 and L2 reading comprehension (Bowers et al., 2010a; Dongbo & Koda, 2012; Goodwin et al., 2013; Jeon, 2011; Kirby et al., 2012; Singson et al., 2000; Wade-Woolley & Geva, 1999; Wang et al., 2006). It has been argued that morphological awareness facilitates understanding of the morphemic structure of words (Carlisle & Feldman, 1995), and then to retrieve meaning and meet semantic gaps in reading comprehension. Recent studies (Choi, 2015; Dongbo & Koda, 2012; Haomin & Koda, 2018; Zhang, 2016b) suggest that beyond the well-acknowledged roles of vocabulary knowledge, morphological awareness predicts reading comprehension. Further, some researchers (Curinga, 2014; Dongbo & Koda, 2012; Goodwin et al., 2013; Kieffer & Lesaux, 2008, 2012a) argue that morphological awareness contributes to vocabulary knowledge and then vocabulary knowledge contributes to reading comprehension. In this context, the next section discusses morphological awareness and its relation to reading comprehension.

2.3. Morphological Awareness and Reading Comprehension

Morphology is one of the sub components of linguistics which refers to the study of the internal structure of the words in a language and the relationship between their form and meaning: “the term ‘morphology’ refers to the study of the internal structure of words and of the systematic

form-meaning correspondences between words” (Booij, 2005, p. 6). Bowers et al. (2010a) argue that morphology is a conventional system by which the smallest units of meaning or morphemes identified as “bases”, “prefixes” and “suffixes” that combine to form complex words. For example, the three morphemes ‘*happy*’, ‘*un-*’, and ‘*-ness*’ combine to form the word ‘*unhappiness*’. There ‘*happy*’ is the base, ‘*un-*’ is the prefix, and ‘*-ness*’ is the suffix. On the basis of their particular behaviours in the formation of words, morphemes are further classed into two categories such as free morphemes and bound morphemes. In this concern the morpheme ‘*happy*’ that can stand independently in a sentence in generating a meaning is considered a free morpheme and the two morphemes ‘*un*’ and ‘*ness*’ that cannot stand independently in a sentence and are used here only to transform the original meaning generated by the free morpheme ‘*happy*’ are bound morphemes. Further, words are categorised as mono-morphemic (simplex words) and multi-morphemic (complex words). For example, as demonstrated above, the word ‘*happy*’ is mono-morphemic and the word ‘*unhappiness*’ is multi morphemic. Moreover, morphemes are classified on the basis of their linguistic nature as inflectional and derivational. Inflectional morphemes represent grammatical elements that are added to words as required but without changing their meaning. For example, the addition of the inflectional morpheme ‘*s*’ changes the word ‘*boy*’ into ‘*boys*’ to signify that the form of the original has changed from the singular into the plural. Nonetheless, a derivational lexical morpheme changes either the meaning or the linguistic designation of a word and at times both. For example, the base ‘*sing*’ which is a verb can be changed into a noun ‘*singer*’ by addition of the derivational or lexical morpheme ‘*er*’. Thus the ability to recognize these structures of words can be considered as morphological awareness.

Such awareness gathered in language that morphemes provide information of word structure and syntactic structure properties may be maintained while wrestling with each new word encountered in the process of reading a text comprehending its meaning. Furthermore, the habit

of dismantling words and identifying every meaningful unit that has gone into it in its formation, that one develops in L1 with the consciousness that arises from such morphological awareness may repeat even while reading and comprehending texts in L2.

The term ‘morphological awareness’ has been used in majority of reading studies from (Carlisle & Nomanbhoy, 1993) to (Zhao, Cheng, & Wu, 2019). In the literature of morphological awareness and reading comprehension, morphological awareness is defined as “awareness of morphemic structures of words and the ability to reflect on and manipulate that structure” (Carlisle & Feldman, 1995, p. 194). It has been argued that awareness of morphemic structure of words may support the reader to identify familiar meaningful units in unknown words, potentially enabling them to infer lexical units during comprehension (Kieffer et al., 2013; Kieffer & Lesaux, 2012b). It has been further argued that awareness of morphological structure may facilitate the reader to understand the syntactic roles of unknown words (Carlisle, 2000; Carlisle & Fleming, 2003; Perdijk, Schreuder, & Verhoeven, 2005). Thus studies (Brittain, 1970; Carlisle, 2000, 2010; Choi, 2015; Hélène Deacon, Tong, & Francis, 2017; Freyd & Baron, 1982; Haomin & Koda, 2018; Kieffer et al., 2013; Pittas & Nunes, 2014; Tyler & Nagy, 1990) argue that the awareness of meaningful units involved in word may uniquely contribute to reading comprehension.

Reading comprehension is a language-based process which starts with linguistic information encoded by the writer and ends with the meaning constructed by the reader (Goodman, 1988). While Gough and Tunmer (1986) and Joshi and Aaron (2000) point out that successful reading comprehension is based on the understanding of the language, Grabe (2002) states that reading comprehension is a linguistic process because meaning is generated by linguistic properties such as word and syntactic structure. As reading comprehension is language-based process, it has been argued that language related skills such as awareness of the combination of smaller meaningful units ‘morphemes’ (Carlisle, 2000), rules of grammar (Layton, Robinson, &

Lawson, 1998), and the meaning of word across a variety of contexts (vocabulary knowledge) (Tannenbaum, Torgesen, & Wagner, 2006; Van Gelderen et al., 2004) may be associated with reading comprehension of students of early school years (Manolitsis, Georgiou, Inoue, & Parrila, 2019; Carlisle & Nomanbhoy, 1993; Mahony et al., 2000; Tunmer, Nesdale, & Wright, 1987), middle school years (Layton et al., 1998; Tyler & Nagy, 1990; Van Gelderen et al., 2004) and high school and college (Diana, 1994; Gottardo, Siegel, & Stanovich, 1997; Landi, 2010).

Reading comprehension may be supported by a conscious awareness of the morphemic structure of words allowing the reader "...to parse words and analyse constituent morphemes..." (Carlisle, 2000, p. 170). Awareness of the morphemic structure of words may facilitate the reader to interpret words and generate meaning from texts (Carlisle & Feldman, 1995; McBride-Chang, Wagner, Muse, Chow, & Shu, 2005). When individuals know more about the functions of morphemes in a word, they can determine the meanings of unknown words and syntactical structures within the text (Perfetti, 2007; Perfetti & Hart, 2002). The more the reader knows about the different functions of morphemes such as the lexical (*un+friendly*) or syntactic information (*ly*) communicated through roots (*friend*), suffixes (*ly*), and prefixes (*un*), the more he/she can determine the meaning of unknown words and complex syntactical structures during reading. In this context, it can be argued that having morphological awareness, one may recognize word and syntactic structure that may support individual word processing and also facilitate correct combining of words within phrases/sentences.

2.4. Morphological Awareness and Vocabulary Knowledge

It has been argued that in addition to reading comprehension, morphological awareness is related to vocabulary knowledge too (Anglin et al., 1993; Deacon & Kirby, 2004; Kuo & Anderson, 2006; Verhoeven & Carlisle, 2006; Nagy & Anderson, 1984) because of their shared

common properties such as form (word parts), meaning and use (grammatical functions) (Nation, 2001). When individuals possess morphological awareness, they tend to analyse and make better inferences of unknown words (Anglin et al., 1993) and identify the smallest meaningful units in words (prefixes, suffixes and root), and in turn, possess vocabulary knowledge (size and depth) (Carlisle & Nomanbhoy, 1993; Kieffer & Box, 2013; Qian, 2002; Shankweiler et al., 1995; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003).

Vocabulary knowledge refers to the number of words known and how well these words are known. Generally, vocabulary knowledge consists of two dimensions: breadth of vocabulary (number of known words) and depth of vocabulary (how well the words are known) (Qian, 1999; Read, 1988; Wesche & Paribakht, 1996). These two dimensions are interconnected (Schmitt & Meara, 1997) and play a significant role in constructing meaning (Qian, 1999). Breadth of vocabulary refers to the size of vocabulary that an individual possesses, whereas depth of vocabulary knowledge is considered as the individual's understanding of the various meanings of a word and how these inter-relate and can be used appropriately in different contexts (Kieffer & Lesaux, 2012a; Qian, 1999). David (1998) states that these two dimensions are interactive and interdependent in exploring the role of vocabulary knowledge in receiving meanings from written text and as a result they receive equal consideration in reading literature.

Researchers (Anglin et al., 1993; Goulden, Nation, & Read, 1990; Nagy & Anderson, 1984) suggest that two or more morphemes can create a large number of words. When the learner has more insight into the process of word formation, he/she can acquire new vocabulary knowledge. Morphological awareness can facilitate both size and depth of vocabulary knowledge. Based on the morphological awareness, individuals are likely to recognise all morphemes in the word which is one aspect of depth of vocabulary knowledge. For example, the word *computerization* can be broken into its individual morphemes, including the base noun *computer* + the verbal suffix – *ize* + the nominal suffix – *tion* and meaning can be assigned to

each smaller unit. This analysis could facilitate the comprehension of the whole word. The same procedure can be applied for the development of size of vocabulary. For example, meaning can be designated to a new word *verification* by identifying the nominal suffix *-(ca)tion*.) When the suffix is disconnected from the rest of the remaining word *veryfi-*, other morphological related words can be recognized as *verifiable*, *verified*, *verify*, *verifies*, *verified* and *verifying* and used to assign meaning to the novel word. In addition, individuals' derivational morphological awareness develops their vocabulary knowledge. For example, when they encounter novel words such as *recognition*, *understandable*, and *clarification*, they are likely to extract the meanings of these words by recognizing their relationship with the meanings of more common expressions such as *recognize*, *understand*, and *clarify*. In this context, studies demonstrate that morphological awareness is correlated with vocabulary knowledge (Nagy & Anderson 1984; Singson et al., 2000; White, Power, & White, 1989; Wysocki & Jenkins, 1987). More advanced morphological awareness may be advantaged in more extensive vocabulary knowledge.

In the existing reading literature, first language studies as well as second language studies have widely documented that morphological awareness correlates independently with vocabulary knowledge (Anglin et al., 1993; Carlisle, 2000; Casalis & Louis-Alexandre, 2000; Choi, 2015; Kieffer & Lesaux, 2008; Mahony et al., 2000; McBride-Chang et al., 2008; Mochizuki & Aizawa, 2000; Paribakht & Wesche, 1999; Wang et al., 2006; Nagy & Anderson, 1984; Nagy, Berninger, & Abbott, 2006; Wysocki & Jenkins, 1987). On the other hand, vocabulary knowledge has been established as an important predictor of reading comprehension in both L1 (Anderson & Freebody, 1982; Beck, Perfetti, & McKeown, 1982; Goulden et al., 1990; Mezynski, 1983; Nation & Snowling, 2004; Richek, 2005; Ricketts, Nation, & Bishop, 2007; Nagy & Anderson, 1984) and in L2 (August & Shanahan, 2017; Droop & Verhoeven, 2003; Koda, 1989; Laufer, 1992; Na & Nation, 1985; Proctor, Carlo, August, & Snow, 2005; Qian,

1999; Schoonen, Hulstijn, & Bossers, 1998; Van Gelderen, Schoonen, Stoel, De Glopper, & Hulstijn, 2007; Verhoeven, 2000; Wagner, Muse, & Tannenbaum, 2007). Therefore, it can be argued that morphological awareness may lead to increased vocabulary size and depth, which in turn leads to better reading comprehension.

Given that morphology and vocabulary share common properties and morphology and vocabulary have associations with reading comprehension (L1 and L2), vocabulary is included in the current study to examine whether morphological awareness could predict uniquely or directly reading comprehension over and beyond vocabulary knowledge or could predict indirectly via vocabulary knowledge. Further, it is possible that part or most of the contribution of morphological awareness to reading comprehension could be made via the assistance of vocabulary knowledge.

2.5. Research on L1/L2 Morphological Awareness and L1/L2 Reading Comprehension

The role of morphological awareness in L1 and L2 reading comprehension has gained increasing interest over the last few decades. Many studies (Apel, 2014; Bowers et al., 2010a; Carlisle, 2000; Cheng, Wang, & Wu, 2018; Choi, 2015; Curinga, 2014; Deacon, Holliman, Dobson, & Harrison, 2018; Dongbo & Koda, 2012; Goodwin et al., 2013; Jeon, 2011; Katz, 2004; Kieffer & Box, 2013; Kieffer & Lesaux, 2012a; Kirby et al., 2012; Kraut, 2015; Leong, 1989; Lin, Cheng, & Wang, 2018; Mahony et al., 2000; To, Tighe, & Binder, 2014; Wade-Woolley & Geva, 1999; Wang et al., 2006; Zhao et al., 2019) have provided empirical evidence to determine whether morphological awareness makes a significant contribution to reading comprehension. The core purpose of all these studies is to provide correlational evidence between morphological awareness and reading comprehension among learners (children and

adults) of L1 and L2 from different language backgrounds. In this section, these studies are reviewed in order to provide a general background to the current study.

Researchers have argued that there are two possible pathways that contribute to morphological awareness and reading comprehension: one through vocabulary development and the other a more direct route bypassing vocabulary. However, there is no conclusive evidence provided to determine whether this contribution is direct or indirect.

Studies on the relationship between morphological awareness and reading comprehension have been conducted with different languages such as English (Carlisle, 2000; Kraut, 2015); Korean (Cho, Chiu, & McBride-Chang, 2011; Wang, Ko, & Choi, 2009), French (Casalis, Deacon, & Pacton, 2011; Deacon et al., 2007), Chinese (Dongbo & Koda, 2012; Ku & Anderson, 2003; McBride-Chang, Shu, Zhou, Wat, & Wagner, 2003; Wang et al., 2006), Arabic (Saiegh-Haddad & Geva, 2008a), Hebrew (Schiff & Calif, 2007), and Spanish (Kieffer & Lesaux, 2008; Ramirez et al., 2010). However, most studies have investigated the relationship between morphological awareness and reading comprehension with English speaking participants (Carlisle, 2000; Carlisle & Fleming, 2003; Deacon & Kirby, 2004; Kirby et al., 2012; Nagy et al., 2006). Compared to the large number of studies conducted in English, relatively little work has been done on morphological awareness and its role in reading in languages of alphabetic orthographies, such as French, and Dutch, the Korean alphasyllabary, and the Chinese non-alphabetic orthography. Although many studies have reported the relationship between morphological awareness and reading comprehension in different language groups, it appears that at least in reading literature, Sinhala language, which is an alphabetic language, has not been taken into account in order to demonstrate that Sinhala morphology directly or indirectly predicts Sinhala reading comprehension.

Furthermore, a growing body of research on morphological awareness and reading comprehension has suggested that morphological awareness contributes to reading comprehension in children as well as adults in both L1 and L2 (Carlisle, 2000; Cho et al., 2011; Choi, 2015; Dongbo & Koda, 2012; Goodwin et al., 2013; Jeon, 2011; Katz, 2004; Kieffer & Lesaux, 2012a; Kirby et al., 2011; Ku & Anderson, 2003; Lam, Chen, Geva, Luo, & Li, 2012; Singson et al., 2000; Tighe & Binder, 2015; To et al., 2014; Wang et al., 2006; Nagy et al., 2006). However, although adequate evidence has been provided relating to morphological awareness and reading comprehension in children from elementary school through adolescence (Carlisle, 2000; Carlisle & Nomanbhoy, 1993; Champion, 1997; Curinga, 2014; de Freitas, da Mota, & Deacon, 2018; Deacon et al., 2017; Goodwin et al., 2013; Jeon, 2011; Katz, 2004; Kieffer et al., 2013; Kieffer & Lesaux, 2012a; Kirby et al., 2012; Mahony et al., 2000; Vaknin-Nusbaum, Sarid, Raveh, & Nevo, 2016; Wang et al., 2006; Nagy et al., 2006; Wolter, Wood, & D'zatko, 2009; Zhang, 2016a), few studies have focused on the relations between morphological awareness and reading comprehension of adults (Dongbo & Koda, 2012; Guo, Roehrig, & Williams, 2011a; Haomin & Koda, 2018; Tighe & Schatschneider, 2016a). Therefore, more studies are needed to explain the association between morphological awareness and reading comprehension with this population. On the other hand, in comparison to L1 studies, the associations between morphological awareness and reading comprehension have not been a main research area of L2 studies.

Although researchers argue that morphological awareness may contribute to reading comprehension irrespective of age limit (kindergarten to university level), and language background (L1 or L2), they fail to provide conclusive evidence to determine whether morphological awareness directly predicts reading comprehension or indirectly predicts reading comprehension via reading-related skills such as vocabulary knowledge. In the existing literature, while some researchers (Dongbo & Koda, 2012; Kieffer & Lesaux, 2012a) argue

that morphological awareness both directly and indirectly contributes to reading comprehension, other researchers (Goodwin et al., 2013; Mahony et al., 2000; Wang et al., 2006) argue that there is only a direct relationship between morphological awareness and reading comprehension. L1 and L2 studies (Choi, 2015; Dongbo & Koda, 2012; Haomin & Koda, 2018; Kieffer & Lesaux, 2012b; Nagy, 2007) suggest that morphological awareness contributes to reading comprehension through the mediation of vocabulary knowledge because morphological awareness facilitates the creation of new words and the development of a broad vocabulary knowledge, which in turn facilitates successful reading comprehension. On the other hand, several studies (Carlisle & Feldman, 1995; Ku & Anderson, 2003; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003) show that morphological awareness has a significant relationship with reading comprehension, even when vocabulary knowledge and other reading-related variables are statistically controlled for. In this regard, it is still debatable whether morphological awareness makes direct or indirect contributions to reading comprehension.

Some researchers argue that morphological awareness directly contributes to reading comprehension, even when other reading-related skills are controlled. For example, Kirby et al. (2012) investigated the relationship between morphological awareness and reading comprehension of English (L1) speaking children (103) from Grade 1 to 3. Both inflectional and derivational morphology were considered in this study. It was emphasized that mostly young children are influenced by inflectional morphology while older children are influenced by derivations. Through regression analysis, they showed that morphological awareness has direct relationship with reading comprehension after controlling for the effects of verbal and nonverbal ability and phonological awareness. In relation to this study, Carlisle (2000) examined the relationship between awareness of the structure and meanings of derived words and reading comprehension of English-speaking third (34) and fourth graders (25) and

demonstrated that morphological awareness uniquely contributed to reading comprehension. The study focused on how the awareness of word structure is related to both understanding of the morphologically complex word meanings and reading comprehension. The author investigated whether morphological analysis has effects on comprehending a piece of writing when readers are aware of the minimal meaningful units of words, their meaning and grammatical roles. The empirical evidence showed that morphological awareness helps to parse words and analyse constituent morphemes for the purpose of constructing meaning from written text. Further, Nagy et al. (2006) examined the contribution of L1 (English) morphological awareness, phonological memory, decoding and vocabulary to reading comprehension among school students from fourth/fifth, sixth/seventh, and eighth/ninth grades. The findings of this study demonstrated that morphological awareness made a significant and direct contribution to reading comprehension above and beyond the vocabulary for all grades (4 to 9). In line with this study, Katz (2004) examined the influence of morphological awareness on reading comprehension of fourth and sixth L1 (English) graders. This research reported that morphological awareness is a significant direct predictor of reading comprehension over and above vocabulary. Further, Gafoor (2013) investigated the association of children's grades two to four L1 (Malayalam) morphological awareness and reading comprehension and revealed that morphological awareness is directly related to reading comprehension. More importantly, Sinhala (L1 language of the participants of the current study) and Malayalam are agglutinative (morphologically more transparent) languages and have structurally and functionally comparable morphological systems. Further, the Sinhala language has borrowed numerous lexical items from Malayalam (Chandralal, 2010).

Both the Sinhala and Malayalam languages belong to the Indic writing system which has combined alphabetic (speech at the phoneme level) and syllabic (speech at the syllable level) nature of the *akshara* orthographies. The Malayalam orthography (Nesan, Sadeghi, & Everatt,

2019) and the Sinhala orthography (Wijaythilake & Parrila, 2019) are shallow or transparent because the pronunciation and writing of the *aksharas* almost always reflect on each other.

As in the Sinhala language (see the section, 2.7), there are two major varieties such as Spoken and Written in the Malayalam language. These two varieties differ in their form, structure, and functions (see Nesan, Sadeghi, & Everatt, 2019). Spoken Malayalam is normally used in everyday discourse whereas written Malayalam is used in text books, newspapers, formal letters, editorials, essays and narratives (Prema, 2016).

Both languages have morpho-syntactic features in which grammatical information is provided by conjugations and concatenation. Information such as negation, passive voice, interrogation, tense, and mood are conjugated to the verb. These languages tend to pay greater attention to the word endings because there is much more grammatical information in the suffixes. Several pieces of grammatical information are found within a word. The suffixes are added to nominal and verbal stems to indicate grammatical categories. Grammatical categories that are inflected in Malayalam include gender, number, case, tense, mood, and voice (Jiang, 2010). Further, the Malayalam and the Sinhala languages are considered as agglutinative languages because what other languages articulate with additional words such as helping verbs and prepositions, in these languages, articulate with suffixes that are added to word roots. For example, nominal root, in Sinhala /govi/ can be conjugated in cases as /goviyata/ (to the farmer) /goviyagen/ (from the farmer) etc. Further, concatenation can be seen in both languages. For example, in Sinhala /giya minisa/ (the man who left), /minisa lawa/ (through the man) in Malayalam /poya manusyan/ (the man who left), /manusyan ilūte/ (through the man). Both languages have a large vocabulary as they draw words from different languages Sanskrit, Tamil, Portuguese, Dutch, and English. Both Sinhala and Malayalam have similar borrowings from another language. For example, the word /mesa/ (table), thoppi (hats) have Portuguese origin. Thus, it seems that morphological systems of these two languages are more complex when compared to English.

Furthermore, Ku and Anderson (2003) reported that morphological awareness directly predicts reading comprehension in L1 Chinese and L1 English-speaking students in second, fourth and sixth grades. Similarly, de Freitas et al. (2018) demonstrated that morphological awareness contributes significantly to reading comprehension even in languages other than English. This study investigated the influence of morphological awareness on the reading comprehension of 132 Portuguese-speaking children in the fourth grade. The authors indicated that morphological awareness directly contributed to reading comprehension. Wang et al. (2009) investigated the role of morphological awareness in reading comprehension of L1 Korean graders from two to four (n=65). The results showed that morphological awareness explained a significant amount of variance in passage-level reading comprehension. In contrast to aforementioned studies, Goodwin et al. (2013) reported that morphological awareness did not make a unique direct contribution to the reading comprehension of Spanish-speaking English language learners, but rather contributed to reading comprehension via its indirect contribution through vocabulary.

Similarly to children's studies, adult studies do not provide conclusive evidence as to whether morphological awareness directly or indirectly contributes to reading comprehension. For example, Diana (1994) examined the relationship between morphological awareness (derivational) and reading comprehension in 26 native English-speaking undergraduate students. This study suggests that morphological sensitivity is necessary for successful reading comprehension. In addition, Wilson-Fowler and Apel (2015) examined direct and indirect association between morphological awareness and literacy abilities in a group of 214 English-speaking undergraduate college students. The results indicated that morphological awareness directly related to reading comprehension. In addition, there was an indirect relationship between morphological awareness and reading comprehension through spelling and word reading. They suggested that readers with stronger morphological awareness may be more likely to recognise the transformation of a verb or adjective to a noun, thereby increasing

comprehension. Further, Haomin and Koda (2018) investigated the contribution of morphological awareness and vocabulary knowledge in the reading comprehension of Chinese adult students. The study suggested that morphological awareness directly predicted reading comprehension. Additionally, this study indicated that morphological awareness mediated the relations between vocabulary and reading comprehension suggesting that vocabulary and morphology are interrelated. Consistent with this study, Guo et al. (2011a) investigated the relationships between vocabulary knowledge, morphological awareness, syntactic awareness and reading comprehension of English-speaking adults. The findings showed that morphological awareness significantly, directly predicted vocabulary knowledge and reading comprehension. All in all, the evidence provided regarding the relationship between L1 morphological awareness and L1 reading comprehension is not adequate to determine whether L1 morphological awareness is directly related to L1 reading comprehension or indirectly related reading comprehension.

In addition to L1 studies, L2 studies suggest that L2 (English) morphological awareness may contribute to L2 reading comprehension. In comparison to L1 studies, the relationship between morphological awareness and reading comprehension has not been the main research area of L2 studies, particularly with the adult population. The studies have mainly concentrated on young learners or adolescents (Cho & Tong, 2014; Curinga, 2014; Goodwin et al., 2013; Jeon, 2011; Kieffer et al., 2013; Kieffer & Lesaux, 2008, 2012a; Lam et al., 2012; Ramirez et al., 2010; Schiff & Calif, 2007; Wang et al., 2006; Wang et al., 2009) rather than adults (Dongbo & Koda, 2012; Koda, 2000), particularly at undergraduate level.

The relationship between morphological awareness and reading comprehension has been concerned in ESL learners of different L1 language backgrounds including speakers of Filipino, and Vietnamese (Kieffer & Lesaux, 2012a), Arabic (Saiegh-Haddad & Geva, 2008a) Chinese (Dongbo & Koda, 2012), French (Hélène Deacon et al., 2007), Hebrew (Schiff &

Calif, 2007), Korean (Wang et al., 2009), and Spanish (Curinga, 2014; Kieffer & Box, 2013; Kieffer & Lesaux, 2008; Ramirez et al., 2010). Further and similarly to L1 research of the relationship between morphological awareness and reading comprehension, L2 research has not provided conclusive evidence to determine whether morphological awareness directly or indirectly contributes to reading comprehension. Some studies (Curinga, 2014; Dongbo & Koda, 2013; Jeon, 2011; Kieffer & Lesaux, 2008, 2012a; Ramirez et al., 2010; Saiegh-Haddad & Geva, 2008a; Wang et al., 2006; Wang et al., 2009) argue that morphological awareness predicts reading comprehension both directly and indirectly, whereas other studies (Dongbo & Koda, 2012; Goodwin et al., 2013; Qian, 1999; Zhang, 2015) argue that morphological awareness only indirectly predicts reading comprehension via reading related skills. For example, Kieffer and Lesaux (2008) examined the relationship between morphological awareness and reading comprehension of grade 4 and 5 Spanish-speaking English language learners, controlling for vocabulary knowledge, decoding and phonological awareness. The results indicated that morphological awareness directly contributed to reading comprehension over and above other variables. Further, Curinga (2014) demonstrated that morphological awareness of Spanish-speaking English language learners contributes to reading comprehension above and beyond vocabulary knowledge. Similar findings surfaced in studies on Korean-speaking ESL learners (Jeon, 2011; Wang et al., 2009). Wang et al. examined the importance of morphological awareness in Korean English-speaking children from grades two to four, controlling for vocabulary, phonemic awareness and decoding, whereas Jeon investigated the contribution of morphological awareness to reading comprehension of tenth graders controlling for phonological awareness, listening comprehension, vocabulary knowledge and metacognitive reading awareness. Both studies suggested that morphological awareness directly contributed to passage-level reading comprehension. Further, Dongbo and Koda (2013) investigated the relationship between morphological awareness and reading

comprehension among sixth-grade Chinese English language learners and demonstrated that English morphological awareness directly predicted English reading comprehension, over and above vocabulary and grammatical knowledge. In addition, Bae and Joshi (2018) suggested that when orthography and phonological awareness of ESL Korean learners (grades five and six) were controlled, L2 morphological awareness directly predicted L2 passage-level reading comprehension. The findings of these studies indicate that morphological awareness of children and adolescents from different language backgrounds, such as Spanish, Filipino, Vietnamese, Korean and Chinese, directly contributed to passage-level reading comprehension. This was so even when different reading-related variables such as vocabulary, word reading fluency, decoding, phonological awareness, listening comprehension, and grammatical knowledge were controlled.

In contrast to the aforementioned studies, Qian (1999) investigated the relationship between L2 morphological awareness and L2 reading comprehension of Chinese and Korean ESL readers in Canadian universities. The results revealed that morphological awareness only indirectly predicts reading comprehension via vocabulary knowledge. In relation to this study, Dongbo and Koda (2012) showed that the morphological awareness of Chinese English language learners in a university in China predicted passage-level reading comprehension only indirectly via size and depth of vocabulary knowledge, instead of having a direct contribution. Both studies revealed that morphological awareness made its contribution to reading comprehension mostly via vocabulary knowledge. This accords with previous studies, establishing that vocabulary knowledge is one of the most important predictors of reading comprehension in adults in general (Anglin et al., 1993; Baumann & Graves, 2010; Braze, Tabor, Shankweiler, & Mencl, 2007; Landi, 2010; Nagy & Anderson, 1984; Zhang, 2015) and L2 readers in particular (Kang, Kang, & Park, 2012; Paradis, 2004; Ullman, 2001, 2005).

Furthermore, in contrast to indirect relationship between morphological awareness and reading comprehension, researchers (Choi, 2015; Kieffer & Box, 2013; Kieffer & Lesaux, 2012a; Zhang, 2015) argue that L2 morphological awareness both directly and indirectly contributes to L2 reading comprehension. For example, Kieffer and Lesaux (2012a) investigated the direct and indirect contributions of morphological awareness to L2 (English) the reading comprehension of sixth grade students from diverse L1 backgrounds such as Spanish-speaking, Filipino-speaking, and Vietnamese-speaking. This study aims to advance the knowledge of how morphological awareness relates to reading comprehension across populations of linguistically diverse students. Vocabulary knowledge and word-reading fluency were used to investigate the mediated relationship between morphology and reading comprehension. The findings indicated that, regardless of linguistic diversity, morphological awareness made a significant direct contribution to reading comprehension when controlling for vocabulary knowledge and indirect contribution via vocabulary knowledge, but not via word-reading fluency. In addition, Kieffer and Box (2013) investigated the direct and indirect relationship between L2 morphological awareness and the reading comprehension of sixth grade Spanish-speaking English language learners. They demonstrated that morphological awareness made a direct contribution to L2 reading comprehension. Additionally, findings indicated that L2 morphological awareness indirectly contributed to reading comprehension via academic vocabulary and word reading fluency. In this regard, a comprehensive picture is hard to obtain from the existing body of research about the contribution of L2 morphological awareness to L2 reading comprehension.

Overall, although, L1 studies and L2 studies have provided empirical evidence regarding the importance of morphological awareness in reading comprehension, it remains unclear whether morphological awareness has direct relationship with reading comprehension or indirect relationship with reading comprehension through vocabulary knowledge.

2.6. Cross-Linguistic Transfer of Morphological Awareness

One of the purposes of the current study is to investigate cross-language transfer of morphological awareness in Sinhala-speaking adult English language learners. Therefore, this section reviews the studies related to the cross-linguistic morphological relationship with reading comprehension.

In Second Language Acquisition (SLA) literature, the concept of transfer was first introduced in the Contrastive Analysis Hypothesis (Stephen, Dulay, & Burt, 1982). Language transfer is still debatable in second language teaching literature. According to the Contrastive Analysis Hypothesis, certain elements in the first language either hinder or facilitate the process of second language acquisition (Dulay et al., 1982; Ellis, 1994; Faerch & Kasper, 1987; Talebi, 2014). Although the central issue of first language transfer in the process of learning a second language has been widely discussed, the researchers still have not provided conclusive evidence on whether first language transfer is positive (Cummins, 1983; Hall, 1990; Jin-kai, 2002; Scott, 1997; Upton & Lee-Thompson, 2001) or negative (Dulay et al., 1982; Aydin Yücesan Durgunoğlu, 2002; Kasper, 1992; Lado, 1957) in the process of learning a second language. In line with this notion, Yan (2010) points out that “.... after several decades of study, linguistic researchers have not reached consensus on whether transfer of L1 knowledge has constructive or destructive influences in the acquisition of second language” (p .97). In this regard, further research is needed in the area of first language transfer in the context of second language learning.

In recent years, studies have argued that different aspects of language competencies such as morphology (Hakuta, 1976; Ramírez, Chen, & Pasquarella, 2013; Schiff & Calif, 2007; Wang et al., 2006), phonology (Chow, McBride-Chang, & Burgess, 2005; Gundel & Tarone, 1983), metalinguistic awareness (Nagy, García, Durgunoğlu, & Hancin-Bhatt, 1993; Koda, 2000),

orthography and syntax (Jarvis & Pavlenko, 2008) could be transferred across languages during the process of reading comprehension.

In the existing literature, compared to transfer of morphological awareness, transfer of phonological awareness has been extensively investigated (Chen, Xu, Nguyen, Hong, & Wang, 2010; Chow et al., 2005; Cisero & Royer, 1995; Comeau, Cormier, Grandmaison, & Lacroix, 1999; D'Angiulli, Siegel, & Serra, 2001; Gottardo, Yan, Siegel, & Wade-Woolley, 2001; Lafrance & Gottardo, 2005; Lekgoko & Winskel, 2008; Lindsey, Manis, & Bailey, 2003; Nagy, García, Durgunoğlu, & Hancin-Bhatt, 1993; Wade-Woolley & Geva, 2000; Widjaja & Winskel, 2004). However, there is growing evidence that morphological awareness can also be transferred across languages and facilitate bi-literacy development. So far transfer of morphological awareness has been only investigated in a few pairs of languages such as Spanish and English (Ramírez et al., 2013), Chinese and English (Jie et al., 2010; Wang et al., 2006), Arabic and English (Saiegh-Haddad & Geva, 2008a), Korean and English (Choi, 2015; Wang et al., 2009), and Hebrew and English (Schiff & Calif, 2007). As a whole, this body of research provides empirical evidence for cross-language transfer of morphological awareness, both between languages with similar morphological structures, (English and Spanish, English and French), and between languages with considerably different morphological structures (English and Hebrew and, English and Arabic). This research supports the view that developed morphological awareness in one language can be utilized in reading comprehension in another language. However, in the literature, researchers (Hayashi & Murphy, 2013; Zhang, 2013) suggest that further research needs to be done regarding morphological awareness transfer even across typologically different language as there is a possibility of morphological transfer.

2.6.1. Research on Cross-Linguistic Morphological Awareness Transfer in L1/L2 Reading

In recent studies, the cross-linguistic role of morphological awareness in reading between L1 and L2 has gained an increasing interest (Cho et al., 2011; Hayashi & Murphy, 2013; Jarvis & Odlin, 2000; Jia & Fuse, 2007; Lowie, 2000; Pasquarella, Chen, Lam, Luo, & Ramirez, 2011; Ramírez et al., 2013; Wang et al., 2006). However, research concerning transfer effects of morphological awareness on reading comprehension between L1 and L2 is limited, particularly with the adult population. Even though a considerable number of studies examining transfer of morphological awareness has focused on bilingual early grade children (Bindman, 2004; Hélène Deacon et al., 2007; Schiff & Calif, 2007) and late primary and middle school years (Ramírez et al., 2010), no study has examined the cross-language influence of morphological awareness on literacy development in bilingual adult students.

As mentioned in the last section, morphological awareness has only been investigated in a few pairs of languages (alphabetic and non-alphabetic) such as Spanish and English, Chinese and English, Arabic and English, French and English, Hebrew and English etc. For example, Wang et al. (2009) examined cross-linguistic contribution of morphological awareness (derivational) to word reading and reading comprehension in Korean ESL learners. The learners' L1 was Korean and L2 was English. In this study, children from grade two to four were tested and the results demonstrated that morphological awareness cross-linguistically (i.e., from Korean to English and English to Korean) contributes to word reading. However, cross-linguistic results did not show any statistically, significant effect on their reading comprehension. The potential reason for this result may be the age level of the participants. The participants in this study were students from grades two to four. They may not have mastered derivational morphology (e.g., syntactic category, parts of speech). Berninger, Abbott, Nagy, and Carlisle (2010) and

Kieffer and Lesaux (2008) showed a similar development tendency in morphological awareness in both L1 learners and in L2 learners. They indicated that derivational morphological awareness may develop in upper elementary grades (e.g., fifth grade), while inflectional morphological awareness may develop in earlier grades. Similar to this study, Deacon et al. (2007) investigated the cross-linguistic morphological relationship with reading in French and English learners from grade one to three. The study revealed that English morphological awareness significantly predicted French reading, after controlling for French morphological awareness. On the other hand, the findings indicated that French morphological awareness also predicted English reading after controlling for the effects of English morphological awareness and English vocabulary. These two studies suggest that morphological awareness may support children's reading development in L1 and L2.

Moreover, Schiff and Calif (2007) revealed that children's Hebrew morphological awareness had a positive relationship with English reading ability. In contrast, Saiegh-Haddad and Geva (2008a) investigated cross-language morphological awareness in word reading with children from grades three to six in Canada. Their L1 was Arabic whereas their L2 was English. Morphological awareness in the two languages was not correlated. It was revealed that Arabic morphological awareness measures did not predict English reading and English morphological awareness measures did not predict Arabic reading. Since there was no transfer between two languages, the authors suggested that morphological awareness might be a language-specific skill that is independent in the two languages of bilingual children. However, Schiff and Calif (2007) claimed that the more similar the two languages are in structure, the more greater the degree of transfer. However, more empirical evidence is needed to support this assertion.

Additionally, evidence of cross-linguistic transfer between an alphabetic and non-alphabetic script was reported in previous studies (e.g., Chinese and English) (Pasquarella et al., 2011; Wang et al., 2006; Wang et al., 2005) suggesting that transfer of morphological awareness not

only occurs between similar writing systems (e.g., Spanish and English), but also between different writing systems (e.g., Chinese and English). Chinese and English are different in terms of the principles of mapping graphemes to sounds. The Chinese writing system is “morpho-syllabic” as each character maps onto a morpheme and a syllable. In contrast, English is an alphabetic writing system in which each letter maps onto a phoneme. Pasquarella et al. (2011) and Wang et al. (2006) reported that Chinese ESL learners’ L2 (English) compound morphological awareness contributed to their L1 (Chinese) reading comprehension. In the study of Wang et al. (2006), parallel measures in Chinese and English were administered to test learners’ morphological awareness, phonological awareness, oral vocabulary, real word reading, and reading comprehension. They found that English morphological awareness of compound structure still contributed to Chinese reading over and above performance of Chinese measures. Similarly to Wang et al, Pasquarella et al. (2011) investigated cross-linguistic transfer of morphological awareness in Chinese English bilingual children from grades (1 to 4). Participants were tested on comparable measures of compound awareness, vocabulary, word reading, and reading comprehension in both Chinese and English. The authors found that English morphological awareness was a significant predictor of Chinese reading comprehension. These studies suggest that morphological structure awareness in the more dominant language (i.e. English, exposed to more frequently) contributed unique variance to reading comprehension in the less dominant language (i.e. Chinese).

In sum, according to the aforementioned studies, it is clear that the researchers have attempted to provide empirical evidence of transfer of morphological awareness in reading between different language backgrounds (L1 and L2). These findings suggest that cross-linguistic morphological awareness transfer may occur not only between similar writing systems (e.g., Spanish and English), but also between different writing systems (e.g., Chinese and English). It seems that a well-developed ability to process morphological information in one language

may facilitate reading comprehension in additional languages. However, almost all the studies have focused on children rather than adults. The question remains as to whether these insights can be generalized to adult learners because their first-language literacy skills are different from children due to the period of exposure to language. Further, although this small group of studies provides some important evidence for cross-linguistic transfer of morphological awareness, little is known about the direction of transfer. While some studies revealed L1 to L2 transfer (Ramirez et al., 2010), others showed the reverse (Pasquarella et al., 2011; Wang et al., 2006) or bidirectional transfer (Deacon et al., 2007). Some researchers argue that the direction of transfer is determined by the proficiency levels of the two languages (Deacon et al., 2007; Wang et al., 2006). They further claim that morphological awareness tends to transfer from learners' more proficient language to their less proficient one. In addition, while some studies argue that the more similar the two languages are in structure, the more likely the degree of transfer, other researchers (Schiff & Calif, 2007) point out that transfer of morphological awareness could be seen from a weaker language to a stronger language. On the other hand it is argued that morphological awareness transfer occurs from a language with a more complex morphological system (e.g., Hebrew, Arabic) to a language with a less complex morphological system (English). Overall, cross-language morphological transfer to reading comprehension is far from clear and, therefore, further examinations are needed.

2.7. The Sinhala language, orthography, and morphology

This segment discusses the orthography, morphology, and writing of the Sinhala language as so far they are not well-researched in the ethnolinguistic literature.

Sinhalese is natively known as Sinhala, "Hela" or (H)Elu" which is one of the two official languages, the other being Tamil. This language is spoken by the majority of the population of Sri Lanka (Disanayaka, 2012; Jayaweera & Dias, 2014; Letterman, 1994). In addition, Sinhala

speaking emigrants can be found in countries such as Australia, New Zealand, UK, North America, Singapore and Middle Eastern countries.

The Sinhala language belongs to the Indo-Aryan branch of the Indo-European language family and its origin dates back to at least 2000 years (Disanayaka, 2012; Fairbanks, 1968). This language has originated and evolved primarily from a combination of two classical Indian languages, Sanskrit and Pali, and developed to the present state drawing influence from the Portuguese, Dutch, and English languages spoken by the European nations who invaded Sri Lanka respectively from the beginning of the early 16th century (Chandralal, 2010). After Sri Lanka's independence from the British crown in 1948, the Sinhala language was used extensively in various domains such as newspapers, literature, government publications, and text books. As a result, the Sinhala language has been developed exponentially both in grammatical structures as well as in words.

The Sinhala language has its own writing system which belongs to the third-second century B.C.E. and it has been subjected to considerable changes since then (Gair, 1996). The Sinhala language is written with a unique akshara script belonging to the Brahmic family of scripts (Wijayathilake & Parrila, 2014). The characters that are used to write in Sinhala is called akshara or akuru (Gunasekara, 1999; Nag & Snowling, 2012) that are influenced by the early Grantha script of South India (Fernando, 1949). As in most Brahmi-derived South Asian Alphabets such as Malayalam, Tamil, Telugu etc, the forms of letters of this language are distinctive (Gair, 1996). The Sinhala writing system is largely phonetic in that one can understand how words are pronounced simply by looking at their spelling (Chandralal, 2010; Gunasekara, 1999). But it is not fully phonetic as mid central vowel /ə/ is established as an independent phoneme in the Sinhala language. There is no particular symbol to represent this phoneme in Sinhala orthography. As the pronunciation of Sinhala akshara is mostly clear from its written form, this language is highly transparent for reading (Wijayathilake & Parrila, 2019;

Wijaythilake, Parrilla, Inoue, & Nag, 2019). In texts, words are separated as in English. Sinhala does not have capital letters as in European languages. It has only one kind of letter.

The modern Sinhala alphabet consists 42 consonants, 16 independent vowels, and 18 dependent vowels (Disanayaka, 2012) and altogether this writing system includes over 600 aksharas (Wijayathilake & Parrila, 2014). Each vowel has an independent symbol. These independent symbols are used only in the initial position of a word. When vowels are used in another position of a word (medial or final positions), diacritic markers (dependent vowels) are used to represent the respective vowels. Although dependent vowels can be combined with consonants, they cannot be combined with independent vowels. Vowels following a consonant are indicated by diacritics which modify the consonant being added to above, below, or on either side of the consonant. For example, න /nɒ/ නා /nɑ:/ නි /ni/ නො /no/ නු /nu/. In Sinhala writing system, vowels and consonants are not represented as an individual unit. Consonant has an inherent vowel /ə/ or /ɑ/, therefore, this writing system is rather syllabic (combination of letters) (Wasala, Weerasinghe, & Gamage, 2006). Consonants are indicated with distinct symbols which pronounce with the inherent vowel /ə/. When a diacritic is combined with a consonant symbol, the inherent vowel /ə/ is dropped from the pronunciation of the syllable. Vowels and consonants are not represented as a single unit but represent as a syllabic unit. In Sinhala writing, one letter is not written after another, instead combination of letters or syllable is written. For example: in the words ‘අපේ ගම’ /ape: gamə/ (our village) the syllables are, අ /ɑ/ පේ /pe:/ ග /gɑ/ ම /mə/. In addition, a consonant (vowel-consonant) indicates one syllable, e.g., පොල් ගස් /pol gas/ (coconut trees). Here the syllables are පොල් ගස් /pol gas/ (Gunasekara, 1999). Unlike in the English writing (consonants and vowels are full letters), in Sinhala writing, consonants are written with characters whereas vowels are indicated with diacritic marks (pili) on those consonants and as a result, the Sinhala alphabet is called as

“abugida” or “alpha-syllabary”. When the diacritic mark is not placed, inherent mark, either /a/ or /ə/ is understood depending on the position of the consonant in the word. For example, the letter ක් /k/ on its own indicates k, either /kʌ/ or /kə/. Sinhala characters are written left to right in horizontal lines.

The Sinhala language is considered as a diglossic language (Gair, 1996; Wijayathilake & Parrila, 2014) as it has two different kinds of varieties: Colloquial or Spoken Sinhala (SS) and Literary or Written Sinhala (WS). Spoken Sinhala and Written Sinhala differ from each other in their form, structure, use, and functions. The form of Sinhala used in written text is not the same as that is spoken in everyday conversation. For example, the difference can be seen in the use of retroflex ල /ɭ/ and ඞ /ɳ/. Although these letters are represented in writing, they are assimilated to alveolar ල /l/ and ඞ /n/ in speech.

Further, the forms of Sinhala used in written text are not the same as that spoken in everyday conversation. For example:

nominative			accusative		
a boy	<i>kollek</i>	(කොල්ලෙක්)	a boy	<i>kolleku</i>	(කොල්ලෙකු)
girls	<i>kello:</i>	(කෙල්ලො)	girls	<i>kellan</i>	(කෙල්ලන්)

These examples show that in the formation and use of animate nouns, written Sinhala makes a distinction between nominative nouns and accusative nouns. But, the Spoken Sinhala does not make this distinction. The forms of nominative noun කොල්ලෙක් /*kollek*/ (a boy) and කෙල්ලො /*kello*/ (girls) are used for both forms of noun: nominative and accusative in Spoken Sinhala. Also, there are no differences in meaning between these two nouns: කොල්ලෙක් /*kollek*/ (a boy) කොල්ලෙකු /*kolleku*/ (a boy) and කෙල්ලො /*kello*/ (girls) කෙල්ලන් /*kellan*/ (girls).

A major difference between SS and WS is the absence of subject-verb agreement in the Spoken Sinhala. Although in the Written Sinhala the choice of the verb is determined by the choice of the noun that functions as the subject of the sentence, in Spoken Sinhala the choice of the verb is not determined by the choice of the noun. Although the grammar rules are highly considered in the Written Sinhala they are less (simplified) considered in Spoken Sinhala. For example:

Spoken Sinhala	Written Sinhala
1) I go <i>mama yanava</i> (මම යනවා)	I go <i>mama yami</i> (මම යමි)
2) We go <i>api yanava</i> (අපි යනවා)	We go <i>api yamu</i> (අපි යමු)
3) I went <i>mama giya, man giya</i> (මම ගියා, මං ගියා)	I went <i>mama giyemi</i> (මම ගියෙමි)
4) We went <i>api giya</i> (අපි ගියා)	We went <i>api giyemu</i> (අපි ගියෙමු)

In the first example, the subjects of the sentences are the same මම /mama/ (I) (both in WS & SS), but the verbs යනවා /yanawa/ and යමි /yami/ are different. Although in SS the sentence මම යනවා /mama yanava/ (I go) is accepted, it is not accepted in WS as it is considered a grammatically wrong sentence. Therefore, the sentence මම යමි /mama yami/ (I go) is accepted in WS as it is grammatically correct (if the subject of the sentence is මම /mama/ (I), the verb ends in මි /mi/. In addition, although the subjects මම /mama/ (I) and අපි /api/ (we) are different in numbers (1st person singular and 1st person plural) between the first example and the second example, the verbs යනවා /yanawa/ (go) are the same in the both sentences in SS and it is accepted. But, in the Written Sinhala, verb is determined according to the subject of the sentence as in the above examples: මම යමි /mama yami/ (I go) අපි යමු /api yamu/ (we go). The similar differences can be seen in the 3rd and the 4th examples as well. Although the

subject-verb agreement is not considered in SS, it is highly considered in WS. Further, even though non-verbal sentences මේ පරණ කාර් එකක් /*me: parana kar ekak* / (this is an old car) are common in SS, these sentences are not allowed in WS. Written Sinhala is generally used for all literary texts and published materials (Weerasinghe, Wasala, & Gamage, 2005). Spoken Sinhala is used in order to communicate with each other in every level of society. Spoken Sinhala and Written Sinhala do differ not only in their form and structure but also in their uses and functions. Differences between Written Sinhala and Spoken Sinhala occur at all levels of language structure (Wijaythilake & Parrila, 2019). Spoken Sinhala is learned at home whereas written Sinhala is taught at school.

The smallest meaningful unit in a language is called ‘morpheme’ which belongs to the linguistic category of morphology: the study of the structure of words. Morphemes are arranged in order to form words. As in most of other languages like English, in the Sinhala language also, a word contains at least one morpheme. The Sinhala language has been influenced by a set of oriental languages such as Sanskrit, Pali, and Tamil as well as some occidental languages such as Dutch, Portuguese and English (Chandralal, 2010) and as a result, the Sinhala vocabulary has been nourished and verbs and nouns have a fairly large number of morphological forms. While Herath, Gamage, and Malalasekara (2007) state that the Sinhala language is an inflectional language in which many verbs and nouns have a fairly large number of morphological forms, Welgama et al. (2011) state that the Sinhala accounts for up to 110 noun words form and up to 282 verb word forms and state that in the Sinhala language, one verb stem could generate more than 45 inflected verb forms. It is surmised that a large number of morphological forms got established as a result of its age (2000 years, 2nd c B.C) and its evolution in exposure to various languages.

In the Sinhala language, morphemes exhibit grammatical distinctions such as gender, person, number, definite-indefinite difference, active/passive, animate-inanimate difference, time, case

(nominative, accusative, dative, locative etc), negative, affirmative and interrogative difference and meaning specifications etc (Gair, 1967; Karunatilake, 1987; Chandralal, 2010). For example: the verb root කළ */kəla/* (do) is inflected by the inflectional suffix ආය */a:yə/* resulting කළාය */kəla:yə/* (did) which indicates gender (feminine) number (singular) person (3rd person) tense (past). When the inflexional suffix /ඒය/ */e:yə/* is inflected to the same verb root කළ */kəla/* it results කළේය */kəle:yə/* (did) which indicates gender (masculine) number (singular) person (3rd person) tense (past). Thus, different kinds of verbal suffixes such as මි */mi/*, මු */mu/*, ඉ */i/*, ති */ti/*, ඊමි */i:m/*, ඊමු */i:mu/*, ඊය */i:yə/*, උභ */u:hə/*, ඉන */inə/*, න */nə/*, එමි */emi/*, එමු */emu/*, එහි */ehi/*, එහු */ehu/*, ඕය */o:yə/*, ආන */a:hə/*, ඒ */e:/*, ආය */a:yə/*, ඔන් */ot/*, ආන */a:hə/*, න */n/*, පන් */pan/*, පිය */piyə/*, දෙන */den/*, වා */wa:/* are inflected to verb roots and exhibit various grammatical elements such as number, gender, person, tense, voice of the activity, conditional form and mood like imperative mood, permissive mood etc.

In addition to verbal morphemes, nominal morphemes such as ආ */a:/*, අ */a/*, එක් */ek/*, අක් */ak/*, එකු */eku/*, අක */aka/*, ඕ */o:/*, උන් */un/*, ඉන් */in/*, අන් */an/*, ආහු */a:hu/* indicate gender (feminine, masculine), number (singular, plural) person (1st, 2nd or 3rd person), case (nominative, accusative, possessive etc), animacy (animate, inanimate), definiteness (definite, indefinite), subjective form and objective form etc. For example: The nominal root කාන්තා */ka:nta:/* (woman) is inflected by ඕ */o:/* resulting කාන්තාවෝ */ka:nta:o:/* (women) which indicates gender (feminine) number (plural) person (3rd person), case (nominative case). Thus, Single morpheme provides a different kinds of grammatical properties and much information about the words (N. Fernando and Weerasinghe (2013). In addition to revealing the information about the words and the grammar of the language, these morphemes provide a deep syntactic

information which is helpful to produce and receive meaning in the language (Herath et al., 2007).

When these morphemes are added to verbal root or nominal root, they have their own position or role in sentences. For example: the words රකිනි /rakiti/ (protect) ගවයන් /gawayan/ (cattle) ගොවියෝ /govio:/ (farmers) (noun and verb) belong to the category called ‘parts of speech’ which provide syntactic information in the Sinhala language. These words belong to different grammatical category and they have their own meaning. When these words are put together in a sentence ගොවියෝ ගවයන් රකිනි /govio: gawayan rakiti/ (farmers protect cattle), it gives a complete meaning and at the same time it provides syntactic information. The sentence is an active sentence. The word order of this sentence is subject + object + verb. The subject is a noun ගොවියෝ /govio:/ (farmers) which is formed by the nominal root ගොවි /govi/ (farmer) and nominative, nominal subjective, inflectional plural suffix ඕ /o:/. The object ගවයන් /gawayan/ is formed by the nominal root and accusative, nominal, objective, inflectional suffix අන් /an/. The verb රකිනි /rakiti/ is formed by the verbal root රකි /raki/ and the third person plural verbal suffix නි /ti/. Thus, these morphemes provide information to identify the lexical elements of the sentence and syntactic elements of the sentence. Also, syntactic information that the subject comes before the object, and then the verb is placed at the end is given. Further, it provides the information that if the subject is in the subjective form, the object should be in the objective form not in the subjective form as ගවයෝ /gawayo:/. If the sentence is formed as ගොවියෝ ගවයෝ රකිනි /govio: gawayo: rakiti/, it is ungrammatical and does not give the real meaning. In order to produce the real meaning of the sentence, the syntactic rules should be followed in the formation of the sentence.

2.8. Conclusions leading to the Current Study

Given that vocabulary and morphology share common properties, morphological awareness has been found to be a significant contributor to vocabulary knowledge, (Anglin et al., 1993; Carlisle, 2000; McBride-Chang et al., 2008; Wysocki & Jenkins, 1987) as well as to reading comprehension (Qian, 1999; Richek, 2005; Nagy & Anderson, 1984; Deacon, Kieffer, Laroche, 2014; Levesque, Kieffer, & Deacon, 2017). Further, some studies argue that morphological awareness is a significant contributor to both vocabulary knowledge and reading comprehension in L1 and L2 (Carlisle, 2000; Kieffer & Lesaux, 2008; Ku & Anderson, 2003; Qian, 1999; Schmitt & Meara, 1997; Wang et al., 2006; Wang et al., 2009). Given the contribution of morphological awareness to vocabulary knowledge on one hand, and that of vocabulary knowledge to reading comprehension on the other, the studies have failed to provide conclusive evidence to determine whether morphological awareness directly or indirectly contributes to reading comprehension via vocabulary knowledge. While some researchers (Curinga, 2014; Goodwin et al., 2013; Haomin & Koda, 2018; Kieffer & Box, 2013; Kieffer & Lesaux, 2012a) argue that via vocabulary knowledge morphological awareness directly as well as indirectly contributes to reading comprehension, other researchers (Carlisle, 2000; Jeon, 2011; Wang et al., 2009) argue that morphological awareness only directly contributes to reading comprehension. They suggest that morphological awareness could predict reading comprehension independent of vocabulary by extracting semantic and syntactic information from words during reading comprehension. Further, other researchers (Dongbo & Koda, 2012; Qian, 1999) point out that morphological awareness only indirectly predicts reading comprehension via vocabulary knowledge. Qian, (1999) suggests that morphological awareness could facilitate the development of a broad vocabulary that in turn facilitates successful comprehension. Consequently, it remains unclear whether morphological awareness would contribute directly or uniquely to reading comprehension, and whether there

would also exist any indirect relationship of morphological awareness with reading comprehension through the mediation of vocabulary knowledge. Although researchers have attempted to address the issue of the complexity of reading comprehension based on morphological awareness, there does not appear to be consistent evidence to determine any unique contribution of morphological awareness to reading comprehension among L1 and L2 learners. Therefore, the present research aims to investigate whether morphological awareness directly contributes to reading comprehension in L1 and L2. Additionally, given that morphology has been associated with vocabulary, and vocabulary predicts reading comprehension, the current study also investigates whether morphological awareness is related to vocabulary knowledge and then is associated with reading comprehension via vocabulary knowledge. In order to have a clear understanding of the relationship between morphological awareness and reading comprehension, the direct and indirect relationships have to be disentangled. In this context, in this study, in order to provide correlational evidence on the relationship between morphological awareness and reading comprehension (direct or indirect) within the regression analysis, both direct and indirect relationships between morphological awareness and reading comprehension are tested with data.

Morphological awareness has been found to be a significant contributor to reading comprehension across languages (alphabetic and non-alphabetic) as well as within languages (Carlisle & Feldman, 1995; Deacon et al., 2007; Ku & Anderson, 2003; McBride-Chang et al., 2003; Pasquarella et al., 2011; Wang et al., 2006; Wang et al., 2009; Nagy et al., 2003). Therefore, the researchers have suggested that morphological awareness transfer is an important factor to be considered in studies which focus on language teaching and learning (Koda, 2007, 2008; Kuo & Anderson, 2006; Marinova-Todd, Siegel, & Mazabel, 2013). Among different aspects of metalinguistic awareness, transfer of morphological awareness has received little attention and morphological awareness transfer has been investigated in only a

few studies (Choi, 2015; Hancin-Bhatt & Nagy, 1994; Pasquarella et al., 2011; Ramírez et al., 2013; Schiff & Calif, 2007). However, these studies suggest that further research needs to be done regarding morphological awareness transfer even across typologically different languages as there is a possibility of morphological transfer. Although evidence of cross-language transfer between an alphabetic script and a non-alphabetic script was reported in previous studies, these have not provided conclusive evidence to determine the direction of transfer of morphological awareness in the process of reading comprehension among bilingual readers. Some studies revealed transfer of L1 morphological awareness to L2 reading comprehension (Ramírez et al., 2010) while others showed reverse transfer (Pasquarella et al., 2011; Wang et al., 2006) or bidirectional transfer (Deacon et al., 2007). Although these studies have provided growing evidence related to cross-language transfer of morphological awareness between different L1 languages and English, particularly, as an L2, conclusive evidence has not been provided to determine the direction of transfer.

Overall, it remains to be considered whether within and across-languages associations found between morphological awareness and reading comprehension in previous studies also exist in Sinhala-speaking English language learners. As supported in the literature review, by using multiple regression analysis, this thesis intends to investigate both direct and indirect contributions of morphological awareness to reading comprehension after controlling for vocabulary knowledge in the (L1 Sinhala), as well as in the (L2 English) among adult Sinhala-speaking English language learners enrolled in degree-courses, particularly students in their initial undergraduate year in a Sri Lankan university. Additionally, this study investigates whether morphological awareness transfers between the Sinhala language and the English language in terms of reading comprehension among these students. The findings of this thesis have implications which support the learners who need to improve literacy in higher education.

Based on the findings of relevant studies previously discussed regarding the relationship between morphological awareness and reading comprehension, morphological awareness and vocabulary knowledge, and vocabulary knowledge and reading comprehension, specifically, this thesis intends to answer three research questions (see sub-section 4.2).

The formal study described in upcoming chapters was preceded by a pilot study, which is now described in chapter 03.

CHAPTER THREE

DEVELOPING MEASURES AND PILOT WORK

3.1. Introduction

This chapter discusses the development of the assessment battery which comprises twelve subtests, six in Sinhala and six in English, used in this study. All measures were parallel and aimed to test similar skills in each language. These subtests were adopted and developed based on pilot studies and previous research conducted in English to measure reading comprehension levels, morphological awareness, and vocabulary knowledge of Sinhala-speaking English language learners in one of the public universities in Sri Lanka. In addition, a background questionnaire was given to all participants to gain information in order to ensure all were Sinhala-speaking English language learners. Based on the objectives of the current study, the assessments were designed to be culturally relevant and linguistically appropriate for the participants. Providing an overview of the twelve measures, the chapter contains three sections: the rationale of the assessment measures; the details of the development of the measures; and the pilot studies and revision. Table 3.1 provides an easy reference to the tests included in the assessment battery.

Table 3.1.*Subtests of the assessment battery*

Reading Comprehension	Questions
	Cloze
Morphological Awareness	Word structure
	Morpho-Syntactic structure
Vocabulary Knowledge	Size of vocabulary
	Depth of vocabulary

3.2. Rationale of the Measures**3.2.1. Reading Comprehension Measures**

The ultimate purpose of reading is constructing meaning from written texts based on visually encoded information. In this study, measures of reading comprehension were included in the assessment battery as the outcome measures. Two reading comprehension measures were used. One involved the reading of passages and the answering of open-ended comprehension questions about the passages, which were unseen prior to this study. The second comprised a Cloze (sentence completion) procedure in which incomplete sentences were given to the students to complete based on their understanding of the sentences. These reading

comprehension measures were given in Sinhala and English. In this thesis, the two measures will be referred to as Reading Comprehension Questions and Reading Comprehension Cloze.

The first reading comprehension measure aimed to mirror the objectives of reading that most students would be familiar with: reading text for understanding so that they could later answer questions or produce answers related to the text. In the current measures, participants were required to read each passage and questions silently and independently. They then had to write short answers (two, three or four words) for each of the open-ended questions related to a passage. All questions were passage dependent with some of these questions required the recall of details in the passage, whereas others required an inference. The test takers could not determine the correct answers by looking at the other passages or questions. All questions could only be responded correctly if the test takers had read and understood the respective passages. The passages and questions were presented on separate pages, and the participants were not allowed to turn back to the passages when answering the questions (to stop re-reading). This procedure aimed to quantify how much information a student retained and comprehended compared to other students under similar conditions of test-taking.

The second reading comprehension measure involved comprehending text at the sentence level and used a Cloze procedure (Williams, Ari, & Santamaria, 2011). Such Cloze procedures have been used before to assess reading comprehension (see, for example, Abraham & Chapelle, 1992; Alderson, 1980; Bormuth, 1963; Fuchs, Fuchs, Hamlett, & Ferguson, 1992; Jenkinson, 1957; Klare, 1974; Kobayashi, 2002; Storey, 1997; Taylor, 1953; Ulusoy, 2008; Yamashita, 2003).

In the task used in the present study, there were four answer options (one was correct and others were incorrect distractors) under each sentence. Participants were required to choose the most appropriate word or phrase out of four different options to give meaning to the sentences or to

interpret the sentence meaning. All possible answers were syntactically appropriate (i.e., they came from the same word category, such as verb, noun, adjective, etc) but only one word was semantically appropriate. This ensured that participants could not solve the items based purely on grammatical awareness as the distractors did not violate the grammatical limitations of the sentence context.

This Cloze measure was selected to contrast with the passage task described above. In this measure, there was less need for linking large sections of text than would have been required for the text reading comprehension measure. The two measures together, therefore, allow the assessment of sentence-level comprehension and passage level comprehension. An English example of a Cloze item is presented below with the correct answer circled for ease of interpretation of the item (see Appendix D for the full measure).

Example

Mala _____ her teeth every morning.

- a. washes
- b. brushes
- c. helps
- d. combs

3.2.2. Morphological Awareness Measures

Morphemes in words indicate word properties (relations between base and derived forms of words) and syntactic properties (parts of speech). The awareness of these properties (internal structure of words) may facilitate reading comprehension. The position taken in this thesis, and the main reason for choosing the specific morphological tasks implemented, is that an awareness of these internal constituents of words, and the ability to analyse the constituent morphemes, should facilitate the understanding of novel words in text. This, in turn, can facilitate reading comprehension or the construction of meaning from written text. Two

different measures were chosen since the measure of Word Structure should assess the participants' awareness of word properties or the morphological structure of a word, whereas the measure of Morpho-Syntactic Structure should assess the participant's awareness of the syntactic properties, or syntactic structure, of a word with the aid of syntactic context clues.

Morphological awareness has been reported to predict unique variance in reading abilities of early elementary students through to undergraduates (Carlisle, 2000; Jarmulowicz, Hay, Taran, & Ethington, 2008; Kieffer & Lesaux, 2008; Liu & McBride-Chang, 2010). Various types of morphological awareness tasks (morphological relatedness, morpheme identification, morphological decomposition, morphological word analogy, non-word derivation, grammatical judgement, word production, test of morphological structure, morphological production, and suffixes choice task) have been developed. However, based on the objectives of the study, two measures of morphological awareness in each language (Sinhala and English) were chosen and these will be referred to as Word Structure and Morpho-Syntactic Structure. In the existing literature, these two tests have been used with children, adolescents, and adults.

The Word Structure test has also been referred to as a 'comes from' test and has been used in a number of studies on morphological awareness in reading (Berko, 1958; Carlisle & Feldman, 1995; Curinga, 2014; Derwing, 1976; Diana, 1994; Mahony et al., 2000). This test assesses the participants' awareness of the morphological structure of words or relations between the base and derived forms of words (Carlisle, 2000), which is one aspect of morphological awareness (Tyler & Nagy, 1989). Feldman and Andjelković (1992) point out that this test can be used to analyze the participants' understanding of morphological relationships between words and their internal morphological structures.

In the measure used in the current research, each item contained pairs of words followed by 'YES' and 'NO'. The test required the participants to circle the word "YES" if they thought

that the second word ‘came from’ or was derived from the first word, or that both words came from the same root. If not, they had to circle the word ‘NO’. English examples (below) clarify the requirements of the task.

Examples

- | | | | |
|----------|-----------|--------------------------------------|-------------------------------------|
| 1. happy | happiness | <input checked="" type="radio"/> YES | <input type="radio"/> NO |
| 2. cat | category | <input type="radio"/> YES | <input checked="" type="radio"/> NO |

The second morphological awareness measure was Morpho-Syntactic Structure. In contrast to the Word Structure test, this test assessed morphological awareness at the syntactic level. Mahony (1994) states that these two tests assess knowledge of the syntactic category of common nouns, verbs, and adjectives.

In the test, each item required the participants to consider the syntactic aspects of a word to complete a sentence. Each sentence was followed by four real words from the same family (noun, verb, adjective, adverb, etc.). From the four possible choices, the participants were required to circle the word which grammatically fit in the blank. The choices were different from each other only in their suffixes. All the items were clear, and the words that possible answers in the blanks were highly constrained syntactically, limiting the choice of possible correct answers to one. An English example of the test requirement is presented below:

Example

The he gave us took us to the wrong street.
 a) directs b) ☒ directions c) directing d) directed

3.2.3. Vocabulary Measures

Two vocabulary measures were used in the study in each language (Sinhala and English). These comprised tests of (i) Size of Vocabulary and (ii) Depth of Vocabulary.

Vocabulary knowledge is the comprehension of the meaning of word in different contexts (Tannenbaum et al., 2006). Different studies have demonstrated that there is a positive association between vocabulary knowledge and reading comprehension (Dongbo & Koda, 2012; Laufer & Ravenhorst-Kalovski, 2010; Lervåg & Aukrust, 2010; Qian, 2002; Shiotsu & Weir, 2007). Further, Guo et al. (2011a) suggest that vocabulary may be one of the best predictors of adults' reading comprehension ability.

Vermeer (2001) claims that vocabulary knowledge is multidimensional as words are composed of phonological, morphological, conceptual or sociolinguistic elements. Vocabulary fundamentally consists of two dimensions: depth of vocabulary (how well the words are known) and breadth of vocabulary (number of known words) (David, 1998; Read, 1988; Wesche & Paribakht, 1996). These two dimensions are interconnected (Schmitt & Meara, 1997) and both facilitate reading comprehension (Ouellette, 2006). Therefore, in this study, both breadth (size) and depth of vocabulary were measured in order to determine the vocabulary knowledge of the participants.

The Size of Vocabulary measure used in this study was developed by Schmitt, Schmitt, and Clapham (2001). Schmitt et al. argue that it was aimed to give an estimate of vocabulary size for the second language (L2) learners of general or academic English, thereby making it highly suitable for the present research. This measure has been used in a number of L2 studies (Choi, 2013; Hatami & Tavakoli, 2013; Qian, 1999; Rashidi & Khosravi, 2010) as a valid measure of vocabulary size.

In this task, each item consisted of six words on the left and three definitions on the right. Out of six words, three words were distractors. Participants were required to match the three definitions with three of the six words on the left. The level of difficulty increased as the participants moved from one section to another. An English example is presented below:

Example

1 business

2 clock part of a house 6

3 horse animal with four legs 3

4 pencil something used for writing 4

5 shoe

6 wall

The second vocabulary measure was used to assess the Depth of Vocabulary. Depth of vocabulary knowledge relates to how well the meanings are known (Anderson & Freebody, 1982; Henriksen, 1999). This measure assessed two aspects of the Depth of Vocabulary knowledge: meaning and collocation. The test developed by Read (1993) was chosen to measure the depth of vocabulary knowledge in English. This test was originally called the Word Associate Test (WAT). In the literature, this test has been used by a number of researchers (see for example, Choi, 2013; Hatami & Tavakoli, 2013; Rashidi & Khosravi, 2010).

In this measure, each item contained one stimulus word, which was an adjective, a box of four adjectives of which one to three could be synonyms, and another box of four nouns from which one to three nouns could collocate (occurring together with the target word in a sentence) with the target adjective. From the two boxes, the participants were required to select any four words that were relevant to the stimulus word. There was not a consistent number of correct answers

in the two boxes: both boxes could have contained two correct answers each, or one box contained one correct choice, while the other box contained three correct answers. An English example of this measure follows to help describe the measure used.

Example

sudden

<input type="checkbox"/> beautiful	<input checked="" type="checkbox"/> surprising	<input checked="" type="checkbox"/> change	<input checked="" type="checkbox"/> noise
<input checked="" type="checkbox"/> quick	<input type="checkbox"/> thirsty	<input type="checkbox"/> doctor	<input type="checkbox"/> school

The term ‘collocation’ has been commonly employed to refer to a phenomenon in language whereby a word has the tendency to retain company with other words. (Bahumaid, 2006). In the above example, if the stimulus word ‘sudden’ accompanies with the given words in the two boxes, participants have to determine that the words are collocated. In the example, the words, *quick* and *surprising* are related in meaning with the stimulus word, ‘sudden’ whereas the words, *change* and *noise* are collocated (keep company) with the same stimulus word. However, the words ‘*doctor*’ and ‘*school*’ are not selected because they are not accompanied by the stimulus word ‘sudden’.

3.3. Developing Measures

The aim of this section is to provide the reader background to the assessments developed for the present study. In order to measure reading comprehension, morphological awareness, and vocabulary knowledge, twelve measures in each language (i.e., Sinhala and English) were used in this study (see Table 3.1). In addition, a questionnaire was used to collect demographic information of the participants. Apart from the English Reading Comprehension Cloze measure (developed by the researcher), the other English measures were taken with permission from the authors cited in the literature. To the best of my knowledge, there were no standardized Sinhala

measures available at the time when the study was performed. As a result, based on the format and testing procedures of the English measures, the researcher selected and developed Sinhala measures that were consistent with the purpose of the study. The Sinhala language has a complex morphological system in which many verbs and nouns have a fairly large number of morphological forms (Chandralal, 2010; Herath et al., 2007). The Sinhala morphemes exhibit different grammatical distinctions such as gender, person, number, time, volition, and case (Chandralal, 2010; Wijaythilake & Parilla, 2019) and syntactic information such as active and passive (Herath et al., 2007) (See Chandralal, 2010). Although the Sinhala morphology is relatively complex, fundamentally, it is comparable with the English morphology (e.g., in both languages a word contains at least one morpheme, and morphemes are of the three major kinds: bases, prefixes and suffixes). However, given that, unlike the English language, the Sinhala language has a complex inflectional system (see chapter 2, section 2.7) in which many verbs and nouns have a fairly large number of morphological forms (Herath, Gamage, & Malalasekara, 2007; Welgama et al., 2011), more items were added to the Sinhala morphological measures (See sections, 3.3.3, 3.4.3.3). These items covered different grammatical distinctions: gender, person, number, time, case, conditional form, and active and passive. Examples can be found in the description of the measures (see pages 80-81). In the process of developing measures, the appropriate use of language and context was maintained by using past examination papers (Ordinary Level, Advanced Level, and Inland-wide Language Training Program) prepared by the Department of Examinations, Sri Lanka, and Sinhala language text books published by the Education Publications Department, Sri Lanka, as a guideline. The measures developed for this particular research were reviewed by four Sinhala native-speaker public university lecturers (subject matter experts) who had been teaching the Sinhala language to undergraduates for several years in Sri Lanka; where necessary, measures were revised based on the comments of the reviewers. The review was

helpful to ensure that the test materials were appropriate for the university-level students participating in this study. Following the initial developments, the measures were piloted on groups of students within a university population similar to those who would be targeted for the main study. All materials are discussed below with an explanation for their purpose, source, and procedures of administration.

3.3.1. Questionnaire

A questionnaire was used to collect demographic information. The questionnaire asked simple questions including participants' age, gender, and English language learning background. The questionnaire consisted of six questions and the participants were required to answer all the questions. The questionnaire was written in both languages: Sinhala and English and students were asked to answer by either of language. The students were given 5 minutes and asked to fill in the information individually while the researcher walked around the room offering help to those who needed it. Verbal instruction was given before answering the questions.

3.3.2. Reading Comprehension Measures

English Reading Comprehension Questions

Although many standardised English reading comprehension measures are accessible for the school population (Cain & Oakhill, 2006), adequate standardized measures aimed specifically for the population of adult are not available (Kruidenier, MacArthur, & Wrigley, 2010; Purvis, 2014). The Adult Reading Text (Brooks, Everatt, & Fidler, 2004) which was standardized on the adult population within the United Kingdom was decided to be the most suitable reading comprehension measure for the sample of this study. This measure has been used in a number of studies (Brooks et al., 2004; Larkin, 2014; Purvis, 2014) with adult participants. With permission from the authors (Brooks et al., 2004), this measure is used in this study (see Appendix A)

The measure comprised four passages followed by 40 comprehension questions (each passage contains 10 questions). Questions were presented in the form of open-ended questions and the passage was not available for further reading when the questions were to be answered. The length of the passages and grade levels increased gradually in the test. The passages contained an average length of 150-300 words.

Participants were asked to write their answers to each of the questions in the test booklet provided. In the process of marking, participants were not penalized for misspelling and grammar as the aim of the task was to measure text reading comprehension levels. Regarding the scoring of this task, a correct answer was given one mark, whereas an incorrect answer or blank indicating no answer was given zero. An example of this measure is presented below.

Example

Wildlife

Last year, a team of top scientists went to Africa to look at a rare herd of elephants. They spent eight months filming and watching the animals. They took turns watching, while the other members of the team slept nearby. They were particularly interested in the different types of food that the elephants ate. They found out that these elephants liked to eat the leaves of a bush called the Round Grass Tree. It was their favourite type of food.

Questions

1. Where did a team of scientists go last year?
2. Why did they go there?
3. Where do you think the scientists stayed?

Sinhala Reading Comprehension Questions

The Sinhala text reading comprehension measure was similar to the English text reading comprehension measure in format and testing procedure. Since a standardised Sinhala text reading comprehension measures could not be found in the Sinhala language, passages from measures that had been developed for another project were adopted and prepared this measure

for the purpose of this study. All the passages were adopted from the past papers of Inland-wide Language Training Program conducted by the Department of Official Languages, Sri Lanka.

In the process of selecting passages for this measure, the content, questions (clear and unambiguous), sentences and passage length, titles of the passages (neither too familiar nor too unfamiliar), word frequencies, syntactic complexity, and academic versus colloquial language forms were considered as these elements could possibly affect objectives of this measure. Basing the passages on those that have been used previous in Sri Lanka increased the likelihood that the text would be appropriate for the target population.

The measure comprised four passages with 26 open-ended questions that were either referential or inferential in nature. As with the English measure, passages were not available when questions were being answered and the participant was expected to write a short answer to each question. The length of the passages and the levels of difficulty increased gradually in the test. The passages contained an average length of 150-400 words. These tests measured the ability to read and interpret meaning from written passages. An example of this measure with translation in English is presented as below.

Sinhala:

පෞරුෂය

සමාජයේ සෑම පුද්ගලයෙකු ම තම පෞරුෂය කෙරෙහි අභිමානයක් ඇති කර ගන්නේ නම් එය සමාජ විෂමතා නැති කිරීමටත් සදාචාරාත්මක සංස්කෘතියක හිමිකරුවන් වීමටත් රටේ දියුණුවටත් මහත් රුකලක් වෙයිවැඩිහිටියන් විසින් . බල පරම්පරාවට උරුමකර දෙනු ලබන්නා වූ සියලු ම පාරිසරික හා මානසික කිරියාවලිය පෞරුෂ වර්ධනය කෙරෙහි බලපායි .

ප්‍රශ්න:

- (i) පුද්ගලයන් තම පෞරුෂය කෙරෙහි අභිමානයක් ඇති කර ගැනීමෙන් සිදුවන යහපත කුමක් ද?

- (ii) බාල පරම්පරාවේ පෞරුෂ චර්ඛනය කෙරෙහි බලපාන්නේ කුමක් ද?

English Translation:

Personality

If every person in the society takes pride in his own personality, it will help to eradicate social inequalities, to become the owners of a moral culture and to develop the country. All the environmental and psychological process inherited by the younger generation are influenced by personality development.

Questions:

- (i) What is the benefit of having a pride in people's personalities?
(ii) What affects the personality development of the younger generation?

English Reading Comprehension Cloze

The second English reading comprehension measure was Reading comprehension Cloze. This test was designed specifically for the purpose of this study and was developed by the researcher based on a website resource, English Marven, which comprised free online English exercises (see the English Marven website <http://englishmaven.org>). This measure comprised fifty sentences with fifty missing key words or phrases. The measure was designed using simple language which should have been familiar to the students. One example was presented prior to the test items.

Scoring of this task involved given, a correct answer one mark, and adding these to produce a total score. An incorrect answer, or a sentence left blank indicating no answer, was given zero (see an example of this measure in the sub-section 3.2.1)

Sinhala Reading Comprehension Cloze

The second Sinhala reading comprehension measure was Reading Comprehension Cloze and was developed by the researcher specifically for the purpose of this study. The items for the

measure were taken from textbooks published by the Department of Examination, Sri Lanka. The researcher used the format of the English Sentence Completion measure as a platform in the process of developing this measure. The task contained 50 items (incomplete sentences) with fifty missing keywords or phrases. All the items were unambiguous and clear. Two examples were presented prior to the test items. The score was the number of sentences completed as for the English version. An example of this measure with translation in English is presented as below and see Appendix E for the full measure.

Sinhala:

පරිසරය _____ පුද්ගලයාගේ ආයුෂ වැඩි වෙයි.

1. නසන
2. රකින
3. කපන
4. පිරන

English Translation:

Enhances the life of the person who _____ the environment.

1. destroys
2. protects
3. cuts
4. combs

3.3.3. Morphological Awareness Measures

English Word Structure

With permission (see Appendix B) from the author (Curinga, 2014), the measure of English Word Structure was adopted to assess the participants' word structure knowledge in the English language. The test was comprised of 40 pairs of words. One half of the word pairs were semantically related while rest were not semantically related. All the items in this task

measured the awareness of structure of word. Two examples were presented prior to the test items. Participants were required to complete all the items, and a correct answer was given one mark, whereas an incorrect answer or a blank indicating no answer was given zero. Marks were added to produce a total score for the measure (see two examples of this measure in the subsection 3.2.2).

Sinhala Word Structure

Since recognised standardised Sinhala word structure measure was not available in the Sinhala language to address the objectives of this study, this measure was developed by the researcher specifically for the purpose of this study. This measure was developed based on text books published by the Educational Publications Department, Sri Lanka, and the book, *Pada Nirmanaya*, (word creation) by Disanayaka (2014) as a guide. It followed the same format and procedures as the English version, and comprised 55 of pairs of words. Two examples were presented prior to the test items and scoring was the same as for the English version. Two examples of this measure with translation in English are presented as below and see Appendix F for the full measure.

Sinhala:

1:	අවශ්‍ය	අනවශ්‍ය	ඔව්	නැත
2:	පොල්	පැපොල්	ඔව්	නැත

English Translation:

1:	necessary	unnecessary	YES	NO
2:	coconuts	papayas	YES	NO

English Morpho-Syntactic Structure

With permission (see Appendix B) from the author (Curinga, 2014), the English Morpho-Syntactic Structure measure was adopted to assess the participants' awareness of syntactic structure of word in context. The task contained 50 items (see the rationale description in the section 3.2.2 for a full description of the items). Two examples were presented prior to the test items.

A correct answer was given one mark, whereas an incorrect answer or blank indicating no answer was given zero (see an example of this measure in the sub-section 3.2.2).

Sinhala Morpho-Syntactic Structure

The Sinhala Morpho-Syntactic Structure measure was equivalent to the English Morpho-Syntactic Structure measure in format and was developed by the researcher specifically for the purpose of this study. The items used in the measure were chosen based on the Ordinary and Advanced Level past examination papers and Sinhala language text books. There were 70 items in the measure (detailed descriptions can be found in the rationale section of this chapter-see sub-section 3.2.2). The items in the measure covered a range of morphological forms of Sinhala: these were person, number, time, case, conditional form, and active and passive. For example, the verbal morpheme 'ආය /a:ya/,' indicates gender (feminine) number (singular) person (3rd person) tense (past) (ගුරුතුමිය සිහින්නාට අලංකාර මල් කිහින්නක් තෑගි කළාය. /gurutumiya sigittata alanka:ra mal kinittak tæ:gi kala:ya/ (The female teacher gifted her a beautiful flower) (see page 230, item 69). The verbal morpheme 'එ /e:/,' indicates passive voice. මිනිසා විසින් ගස කැපේ. /minisa: visin gasa kæpe:/ (The tree is cut by the man) (see page 228, item 43). The verbal morpheme 'ඔත් /ot/,' indicates conditional form. වැසි වැස්සෙන්නේ ගඟ ගලාවි. /wæsi wæssot gala:vi/ (If it rains, the river will be flooded)

(see page 228, item 41). Further, the nominal root ගොවි /govɪ/ (farmer) is inflected by ඕ /o:/ resulting ගොවියෝ /govɪyo:/ (farmers) which indicates gender (masculine) number (plural) person (3rd person), case (nominative case), active voice. ගොවියෝ ගවයන් රකිති. /goviyo gavayan rakiti/ (Farmers protect cattle) (see page 225, item 5). Additionally, the items used in the measure consisted of different kinds of verbal morphemes such as මු /mu/ (see page 225, item 1), ති /ti/ (see page 226, item 20), ඊය /i:ya/ (see page 228, item 44), ඒ /e:/ (see page 225, item 4), and nominal morphemes such as ආ /a:/ (see page 230, item 68), අන් /an/ (see page 225, item 9), එක් /ek/ (see page 229, item 58), අක් /ak/ (see page 227, item 30), අක /aka/ (see page 226, item 16), ඕ /o:/ (see page 227, item 37), උන් /un/ (see page 227, item 29), ඉන් /in/ (see page 228, item 42), එන් /en/ (see page 228, item 51) which covered grammatical distinctions: gender (feminine, masculine), number (singular, plural) person (1st, 2nd or 3rd person), case (nominative, accusative, possessive). One example was presented prior to the test items and the scoring procedure was identified to the English version. An example of this measure with translation in English is presented as below and see Appendix G for the full measure.

Sinhala:

1. උපකුලපතිවරයා ඉතා උනන්දුවෙන් කලා අමතයි .
 - a) උපාධිධර යා b) උපධිධරයාට c) උපාධිධරයන් d) උපධිධරයාගෙන්

English Translation:

1. The Vice Chancellor earnestly addresses
 - a) graduate b) to graduate c) graduates d) from graduate

3.3.4. Vocabulary Measures

English Size of Vocabulary

With permission (see Appendix C) from the authors (Schmitt et al., 2001), the measure of English Size of Vocabulary was adopted to measure participants' size of vocabulary knowledge (see sub-section 3.2.3 for further information about this sort of measure). This test is composed of two distinct frequency levels: high-frequency and low-frequency. This test consisted of ten items in each section, producing a total of 30 items altogether. An example was presented prior to the test items.

Scoring of this task was based on a correct answer being given one mark, whereas an incorrect answer or blank indicating no answer was given zero. The total of the marks was the score for the measure. Three examples (high and low-frequency levels) of this measure are presented as below.

Examples

High Frequency Level

- 1 copy
- 2 event end or higher point _____
- 3 motor this moves a car _____
- 4 pity thing made to be like another _____
- 5 profit
- 6 tip

Low Frequency Level

- 1 correspond
- 2 diminish keep _____
- 3 emerge match or be in agreement with _____
- 4 highlight give special attention to something _____
- 5 invoke
- 6 retain

Sinhala Size of Vocabulary

The Sinhala Size of Vocabulary test was developed by the researcher to be equivalent to the English Size of Vocabulary test in format, procedures and scoring. The items of the measure were developed using Ordinary, Advanced Levels (National Examinations, Sri Lanka) and University past Sinhala examination papers and the Sinhala language text books as a guide. A set of words was selected from different genres namely, Creative Writing, Technical Writing and News Reportage which had been used in the past examination papers as part of the requirement to read passages. Additionally, a set of vocabulary was selected from the Sinhala vocabulary lists of the secondary level education Sinhala language textbooks. In the text books, each reading lesson entails a list of words which were targets for improving vocabulary. The task contained 30 items. An example was presented prior to the test items.

The following factors were considered in the process of developing this measure (Schmitt et al., 2001).

- 1) The definitions were short in order to minimise reading.
- 2) The option words in each cluster had very different meanings so that the participants could make the correct match even though they have only a minimal impression of target words.

- 3) The words used in the definitions were always more frequent than the target words in order to make sure that the ability to demonstrate knowledge of the target words was not compromised by a lack of knowledge of the defining words.

An example of this measure with translation in English is presented as below and see Appendix H for the full measure.

Sinhala:

- | | | | |
|---|------------|--------------------|-------|
| 1 | අනන්‍යතාවය | | |
| 2 | කුතුහලය | පුද්ගලය | _____ |
| 3 | ලාභය | නොවෙනස් බව | _____ |
| 4 | වරප්‍රසාද | විශේෂ අයිති වාසිකම | _____ |
| 5 | සම්ප්‍රදාය | | |
| 6 | සැකය | | |

English Translation:

- | | | | |
|---|------------|---------------|-------|
| 1 | identity | | |
| 2 | curiosity | surprise | _____ |
| 3 | profit | unchanged | _____ |
| 4 | privileges | special right | _____ |
| 5 | tradition | | |
| 6 | suspicion | | |

English Depth of Vocabulary

With permission (see Appendix D) from the author Read (1993), the English Depth of Vocabulary task was adopted to measure depth of vocabulary knowledge of the participants. This test contained 160 items – see the previous rationale section of this chapter for a detailed

description of the measure (see sub-section 3.2.3). Two examples were presented prior to the test items.

Scoring of this task involved, a correct answer being given one mark, whereas an incorrect answer or blank indicating no answer was given zero. The addition of the marks was the score for the measure (see an example of this measure in the sub-section 3.2.3).

Sinhala Depth of Vocabulary

This measure was used to assess depth of Sinhala vocabulary knowledge of the participants. The Sinhala Depth of Vocabulary test was equivalent to the English Depth of Vocabulary test in format, procedures and scoring and was developed by the researcher specifically for the purpose of this study using the Ordinary and Advanced Levels past papers and the Sinhala language text books as a guide. The task consisted of 160 items – see the previous rationale section of this chapter for a detailed description of the measure (sub-section 3.2.3). One example was presented prior to the test items. An example of this measure with translation in English is presented as below and see Appendix I for the full measure.

Sinhala:

දීප්තිමත්

<input type="checkbox"/> ආකර්ෂණීය	<input type="checkbox"/> පළමු	<input type="checkbox"/> මෙහෙවර	<input checked="" type="checkbox"/> ශිෂ්‍යයා
<input checked="" type="checkbox"/> නිරවුල්	<input checked="" type="checkbox"/> පැහැදිලි	<input type="checkbox"/> අපේක්ෂාව	<input checked="" type="checkbox"/> අනාගතය

English Translation:

bright

<input type="checkbox"/> attractive	<input type="checkbox"/> first	<input type="checkbox"/> mission	<input checked="" type="checkbox"/> student
<input checked="" type="checkbox"/> clear	<input checked="" type="checkbox"/> crystal	<input type="checkbox"/> prospect	<input checked="" type="checkbox"/> future

3.4. Measures for the Pilot Study

After initial development of the measures (Reading Comprehension Questions, Reading Comprehension Cloze, Words Structure, Morpho-Syntactic Structure, Size of Vocabulary, Depth of Vocabulary in Sinhala and English), they were piloted before finalising for the main study.

3.4.1. The Order of Presentation of Measures

The order of presentation of measures was decided according to the participants' familiarity of the formats of the measures. The participants of this study were familiar with the formats of text reading comprehension, sentence completion, word structure and morpho-syntactic structure since similar formats had been used in their national examinations at Ordinary and Advanced levels. However, they would not have prior exposure to the formats of the measures of size of vocabulary and depth of vocabulary. If the students came across a test with an unfamiliar format at the beginning of the testing procedure, they would be reluctant to answer the other measures. Therefore, the order of the measures was arranged as 1. Reading Comprehension Questions, 2. Reading Comprehension Cloze, 3. Word Structure, 4. Morpho-Syntactic Structure, 5. Size of vocabulary, and 6. Depth of Vocabulary.

3.4.2. Piloting the Assessment Battery

An assessment battery consisted of 12 subtests and questionnaire was piloted three times with small groups of students (native speakers of Sinhala in Sri Lanka) within the broader population (Sinhala-speaking English language learners) of those that would be targeted for the main study. Participation in the studies was completely voluntary. About one week before the testing the researcher met the students with their ESL teachers and explained what was expected. The students those who gave their consent to participate in the study were recruited. Participants

completed the assessments via group testing. This included measures of reading comprehension, morphology and vocabulary in Sinhala and English. The aim of the pilot studies was to assess the consistency and ability (appropriateness) of the developed measures to address the objectives of this thesis. The administration procedure of these tests, pilot studies and their results, and the changes made to the finalized assessments are discussed in the following sections.

3.4.3. Test Procedures

The administration procedure for pilot studies was similar to the general procedure. All the pilot studies were conducted with Sinhala-speaking English language learners at the university which was to be the venue for the main study. Testing was conducted by appointment after class hours. As these tests were administered in a classroom setting, tests were written in a paper-based format. The test booklets were distributed to individuals (one booklet per participant) taking the test. Each participant was given the same assessment battery. All tasks were clearly explained with examples.

The researcher ensured that whether the participants had the materials for completing the measures (the booklet, pen or pencil). The environment (lighting/noise/temperature/tiered seating) was appropriate for completing tests, and participants had enough space to write in the booklet without disturbance from those around them. They were aware that they should write answers in English for the English measures and in Sinhala for the Sinhala measures.

Both oral and written instructions were provided before each measure. After these instructions, participants were provided with practice trials for each test with the exception of the text reading comprehension (they are familiar with comprehension tests) to ensure that the participants understood the requirement of tests. After the practical trials, the participants were

encouraged to ask questions regarding the tests if they were unsure of the requirements of the test.

Both Sinhala and English measures were marked based on the correct answers for each item (as per details provided in the measure development sub-section: 3.3). The scores for each item of each test were entered into a statistical analysis programme (SPSS version 25) and analyses per item were undertaken.

In the first pilot study, all the measures were piloted and the measures that showed acceptable level of reliability (see section 3.4.1) were retained. The rest, after the modifications, were piloted again (2nd pilot). In the first pilot study, the participants were given as much time as they wanted to complete the tests – there were no time limits on any measure. The researcher recorded the time for each test, in addition to the participants' comments/feedback, for future modification of the measures and procedures. In the second pilot study, time-limits for some of the measures were determined, based on the recorded time in the first pilot study, and piloted in this second study. In this study, the alpha score for the measures produced reasonable evidence for the reliability (see section 3.4.2). The results of the first and the second pilot studies showed acceptable level of reliability for all the measures in the assessment battery and indicated that the battery was ready for the main study. However, the entire assessment battery was administered (3rd pilot) again before the main study in order to investigate the whole battery again to assess time limits, test items in each measure, and test procedures (see section 3.4.3).

3.4.3.1. Pilot Study 1

The first pilot study was conducted with Sinhala-speaking English language learners ($n = 17$). The tests: Reading Comprehension questions, Reading Comprehension Cloze, Word Structure, Morpho-Syntactic Structure, Size of Vocabulary and Depth of Vocabulary in Sinhala and

English were administered to the whole group during three one-hour sessions, depending primarily on participants' availability. Assessment of internal consistency reliability (Cronbach's Alpha) produced acceptable level of reliability (which was taken as evidence for the reliability of these measures) for all the English measures (see table 3.2.) except the English Word Structure measure. The reliability analysis of this measure produced an alpha score of .174, too small a value to give confidence about the reliability of the scale. In order to improve the alpha score for this measure, some items were deleted to identify a set that would show better evidence of reliability; however, the best set of items still only produced an alpha score of .382, which was still considered questionable as evidence for reliability of the scale. Therefore, based on observations of the pilot students' performance on the task, this measure was revised to a time-limited measure and piloted again.

The internal consistency reliability analyses were also calculated for the Sinhala measures, all measures except the Sinhala Depth of Vocabulary measure showed poor evidence of reliability based on alpha score (see Table 3.2.). The alpha score for the Sinhala Depth of Vocabulary did produce reasonable evidence for the reliability .875. Procedures for deleting items which showed no variability (either too easy or too difficult to answer) were used in an attempt to produce a set of items that shows better levels of inter-relationships for the Sinhala measures which were not reliable according to alpha scores. The Sinhala Text Reading Comprehension measure with 26 items initially produced an alpha of .559. Additional analyses of the items indicated that some items showed no variability (all students got their items correct) and, hence, had a zero item-total correlation. These items, were therefore, deleted. In addition, some items produced sizeable negative item total-correlations. These items, therefore, were also deleted. An additional item was also deleted bringing the internal consistency reliability value to .713 for the remaining 20 items (see Table 3.2 for the results of the pilot study 1).

The rest of the Sinhala measures: Reading comprehension Cloze, Word Structure, Morpho-Syntactic Structure, Size of Vocabulary were targeted for changes to items or test procedures, and piloted again.

Table 3.2.

The results of the internal consistency of the measures in English and Sinhala from pilot study 1

Tests		No of items	α	Min to Max	Mean	Standard deviation	Skewness	Kurtosis
English measures								
Comprehension	RCQ	40	.879	16-36	28.24	6.24	.43	-.73
	RCC	50	.712	34-48	43.71	3.54	.21	-.87
Morphology	WS	40	.174	32-38	35.18	2.03	-.56	-1.00
	MSS	50	.835	25-49	41.94	6.97	.07	.51
Vocabulary	SV	90	.934	35-82	67.53	12.65	-.25	-.65
	DV	160	.898	46-101	77.88	17.99	-.98	.97
Sinhala measures								
Comprehension	RCQ	20	.713	8-18	12.06	3.05	.43	-.68
	RCC	50	-.874	43-47	45.12	1.21	.21	2.17
Morphology	WS	55	.486	46-53	50.18	2.48	-.56	-1.51
	MSS	50	.555	33-47	39.82	3.45	.07	1.11
Vocabulary	SV	90	.370	76-86	81.71	2.91	-.25	1.62
	DV	160	.875	97-145	127.82	12.36	-.98	-.87

Note. RCQ= Reading Comprehension Questions, RCC= Reading Comprehension Cloze, WS= Word Structure, MSS= Morpho-Syntactic Structure, SV= Size of Vocabulary, DV=Depth of Vocabulary

3.4.3.2. Pilot Study 2

Based on the outcomes of the first pilot study, the English measures: Reading Comprehension Questions and Cloze, Morpho-Syntactic Structure, Size of Vocabulary, and Depth of Vocabulary, and the Sinhala measures: Reading Comprehension Questions, Depth of Vocabulary that showed evidence of reliability were retained but the remaining measures were modified either in items or the test procedures, and were re-piloted (Pilot Study 2).

The pilot study 2 was conducted with Sinhala-speaking English language learners ($n = 15$) of the same university where the Pilot study 1 was conducted with other participants. The tests: English Word Structure, Sinhala Reading Comprehension Cloze, Sinhala Word Structure, Sinhala Morpho-Syntactic Structure and Sinhala Size of Vocabulary were administered to the whole group during a thirty minute session, depending primarily on participants' availability.

This second pilot was performed mainly to assess the inclusion of time limits for these measures. The rational for limiting the time for these measures was to ensure variability in the participants' performance and to reduce the ceiling effects evident in the measures. In addition, based on the results of the first pilot study, the measure of Sinhala Size of Vocabulary was more substantially revised (e.g., items were replaced) before the second pilot study. These revisions are described below.

The English measure of Word Structure was revised to a time-limited measure. Based on the recorded time in the first pilot study, students were given two minutes to complete the task. The test contained 40 items and the participants completed the task within the stipulated time. Assessment of internal consistency reliability (Cronbach's Alpha) did produce reasonable evidence for the reliability of this scale: $\alpha = .900$.

The Sinhala Reading Comprehension Cloze measure contained 50 items and two minutes were allocated for the measure. However, no one could respond to all items (50) within the permitted

time. The number of items responded within 2 minutes were 35 (from 1 to 35). The reliability of this time-limited measure with 35 items as .872. Therefore, these items and the time-limited procedures were retained.

The Sinhala Word Structure test consisted of 55 items. One minute was allocated for the test. Assessment of internal consistency reliability produced the result as .969 which indicted reasonable evidence for reliability.

The Sinhala measure of Morpho-Syntactic Structure contained 50 items. Five minutes were allocated for the task and the participants completed the task within the stipulated time. Assessment of internal consistency reliability produced the result as .888 which was confident enough for the reliability of the measure.

In the first pilot study, the Sinhala Size of Vocabulary measure contained 90 items. Before the second pilot study, this measure was revised and some items were replaced (previous method to develop items was followed) as they did not show adequate variability (all students got these items correct), and, hence had a zero item-total correlation. The items showed variability were retained and the rest were deleted by replacing new items. The revised measure consisted of 81 items. Based on the recorded time during the first pilot study, 14 minutes were allocated for the measure. The reliability of the measure produced reasonable evidence for the reliability of this scale: $\alpha = .933$. Therefore, these items were retained. The results for pilot study 2 are presented in the Table 3.3.

Table 3.3.

The results of the internal consistency of the measures in English and Sinhala from pilot study 2

Tests	No of items	Time in minute	α	Min to Max	Mean	Standard deviation	Skewness	Kurtosis
EWS	40	2	.900	15-37	29.00	7.31	-.90	-.47
SRCC	35	2	.872	23-35	31.40	3.43	-1.59	1.79
SWS	55	1	.969	44-53	48.53	2.87	-.16	-.95
SMSS	50	5	.888	23-44	38.67	5.90	-1.40	2.26
SSV	81	14	.933	10-62	47.73	14.33	-1.73	2.74

Note. EWS= English Word Structure, SRCC= Sinhala Reading Comprehension Cloze, SWS=Sinhala Word Structure, SMSS= Sinhala-Syntactic Structure, SSV= Sinhala Size of Vocabulary

3.4.3.3. Pilot Study 3

This third pilot was performed mainly to assess the inclusion of time limits for these measures and test procedure. The entire assessment battery was piloted in the third pilot study with a small group of students ($n=15$). The tests were administered to the whole group during three one-hour sessions, depending primarily on participants' availability. In this study, time allocation for the measures and test items in each measure (see Table 3.4) were maintained based on the first and the second pilot studies. In this study, except Sinhala Size of Vocabulary, assessment of internal consistency reliability (Cronbach's Alpha) produced acceptable level of reliability for all other measures. Although reasonable reliability value (.933) showed for the Sinhala Size of Vocabulary in the 2nd pilot study, assessment of internal consistency reliability produced for this measure in the 3rd pilot study was .690, which was too small a value to give confidence

about the reliability of the scale. In order to improve the alpha scores for this measure, two items which showed ceiling effects (no variability) and four items that produced sizeable negative item total-correlations were deleted in order to identify a set that would show better evidence for reliability. This set of items (75) produced an alpha score of .741. Therefore, these items were retained for the main study, and in the main study, they produced an alpha score of .789 (see Chapter 04, sub-section 4.7.1). Additionally, in the second pilot study, the Sinhala Morpho-Syntactic Structure measure contained 50 items and the measure produced reasonable level of reliability. However, given that Sinhala has a much more complex inflectional system in which many verbs and nouns have a fairly large number of morphological forms (Herath, Gamage, & Malalasekara, 2007; Welgama et al., 2011) than English, before the third pilot study, an additional 20 items (same procedure used as for the other 50 items was followed) were added to the test to make it more equivalent (in terms of morphological system) to the measure of English Morpho-Syntactic Structure. As new items were included, eight minutes (5 minutes in the 2nd pilot) were allocated for the measure. The time allocation, preserved items for each measure and the results of the pilot study 3 are presented in the Table 3.4.

Table 3.4.

The results of the internal consistency of the measures in English and Sinhala from pilot study 3

Tests	No of items	Time in minute	α	Min to Max	Mean	Standard deviation	Skewness	Kurtosis
ERCQ	40	60	.867	10-32	20.40	6.73	-.18	-.94
ERCC	50	5	.925	11-38	30-60	7.05	-1.55	3.22
EWS	40	3	.727	24-37	32-47	3.99	-1.02	.01
WMSS	50	12	.957	13-47	34-60	12.24	-.90	-.74
ESV	90	20	.931	30-85	59-80	15.59	-.58	.38
EDV	160	20	.920	25-115	78.40	21.65	-.95	1.72
SRCQ	18	40	.725	2-14	9.27	3.30	-.69	.02
SRCC	35	2	.904	4-32	15.67	6.37	.70	2.64
SWS	55	1	.820	21-41	33.07	5.86	-.55	-.47
SMSS	70	8	.911	35-65	53.47	10.32	-.88	-.57
SSV	75	14	.741	40-66	52.60	6.49	.02	.52
SDV	160	9	.971	42-153	116.93	32.03	-.1.42	1.53

Note. ERCQ= English Reading Comprehension Questions, ERCC= English Reading Comprehension Cloze, EWS= English Word Structure, EMSS= English Morpho-Syntactic Structure, ESV= English Size of Vocabulary, EDV= English Depth of Vocabulary, SRCQ= Sinhala Reading Comprehension Questions, SRCC= Sinhala Reading Comprehension Cloze, SWS= Sinhala Word Structure, SMSS= Sinhala Morpho-Syntactic Structure, SSV= Sinhala Size of Vocabulary, SDV= Sinhala Depth of Vocabulary

As acceptable levels of reliability were produced for all measures in the third pilot study, the same time allocation and, test items for each measure, as well as the same administration procedure used in the third pilot study were considered to be appropriate for the main study.

CHAPTER FOUR

METHODOLOGY AND RESULTS

4.1. Introduction

This chapter discusses the procedures for data collection and analyses used to address the research questions of the current study. The chapter provides information on the characteristics of participants involved in this study and gives an overview of the measurement materials and administration of the measures. Preliminary findings (reliability, descriptive statistics, and correlations between measures of the same construct) are reported in this chapter, followed by the findings from the correlations between the dependent variables and independent variables. Finally, evidence for the research questions based on the results from Hierarchical Multiple Regression Analyses is presented.

4.2. Research questions

After reviewing the current literature on reading comprehension in general, and morphological awareness and reading comprehension (see Chapter 02) in particular, three research questions were identified with the purpose of attempting to fill in gaps in what had been previously studied.

- (i) Does Sinhala (L1) morphological awareness have direct or indirect relationship with Sinhala reading comprehension?
- (ii) Does English (L2) morphological awareness have direct or indirect relationship with English reading comprehension?
- (iii) Does morphological awareness transfer between the Sinhala language (L1) and the English language (L2) in reading comprehension?

4.3. Participants

The cohort of participants (N = 189) recruited for this study comprised full-time undergraduate students enrolled in one of the public universities in Sri Lanka. All participants were first-year, first-semester students (age range 19-24 years), and the cohort included males (48) and females (141). These students had been studying at the university for one month when the study was carried out. All the participants were Sinhala-speaking English as a Second Language (ESL) learners.

Given that the knowledge of English is essential in reaching the expected goals in educational and professional life, English is taught as a second language in Sri Lanka. In the current study, according to the background questionnaire, a few participants mentioned that they spoke both Sinhala and English at home and the majority of the participants indicated that they spoke only in Sinhala at home. Further, the questionnaire provided evidence that the majority of the participants were 7-8 years old when they were first exposed to the English language (movies, songs, books). Additionally, it was indicated that these participants had been learning English for about 12-14 years.

Participation in the study was completely voluntary and all those who gave their consent to participate in the study were recruited. About one to two weeks before the testing, I met the students with their ESL teachers and explained what was expected. Participants completed the assessments via group testing. This included measures of reading comprehension, morphology and vocabulary in Sinhala and English. Approval from the University of Canterbury's Educational Research Human Ethics Committee, and relevant approval from the University of Ruhuna, Sri Lanka, to conduct the study, were obtained prior to the study, and the confidentiality of participants was maintained.

4.4. Measures for the main study

The measures included in this study are outlined in detail in chapter three of this thesis. An assessment battery comprising 12 subtests in both languages (Sinhala and English) was used to collect data for this study. The materials used in this study can be divided into three parts: Reading Measures: Reading Comprehension Questions, Reading Comprehension Cloze; Morphological Awareness Measures: Word Structure and Morpho-Syntactic Structure; and Vocabulary Knowledge Measures: Size of Vocabulary and Depth of Vocabulary. These measures were used to assess the participants' reading comprehension levels, morphological awareness, and vocabulary knowledge. Additionally, demographic information (age, gender and English language learning background) was collected through a questionnaire.

4.4.1. The order of presentation of measures

The order of presentation of measures was decided according to the participants' familiarity of the formats of the measures. This order was similar to the pilot studies (see Chapter 3, sub-section 3.4.1). All the participants were required to complete the assessments within the stipulated time in order to ensure reliability and consistency as much as possible. Times for measures were decided based on the pilot study (see Chapter 03). As these tests were administered in a classroom setting, tests were written in a paper-based format.

4.5. Data collection procedure

The administration procedure for the main study was similar to pilot studies (see Chapter 03, section, 3.4.3). This study was conducted at the beginning of the first semester, within the first academic year of a Sri Lankan University, and participants were given paper-based versions of the assessments of morphological awareness, vocabulary knowledge, and reading comprehension. The test booklets were distributed to individuals (one booklet per participant)

taking the test. The assessment battery was the same for each participant. All tasks were clearly explained with examples.

Before the testing procedure, the purpose of the testing was clearly explained to the participants in order to make them aware of the value of what they were doing. They were briefed about the objectives and the outcomes of the study. All tests were administered in a group session that occurred in a quiet comfortable classroom setting. All group testing was conducted by the researcher in an assigned classroom on campus. Testing sessions were scheduled to accommodate availability of the students.

The duration of the assessment was approximately 200 minutes (75 minutes for the Sinhala measures, 120 minutes for the English measures and 05 minutes for the questionnaire.) Each test session took approximately 60 minutes including short breaks, meaning that the full testing procedure was performed over several sessions, which reduced the possibility of fatigue. The researcher monitored student behaviour during each session and answered any administration questions individually in order to keep distractions in the classroom to a minimum. The dropout rate among participants was very low (3 out of 192). Although these three students participated in the English measure session, they could not participate in the Sinhala measure session due to illness (the students later informed the researcher of the reason for their absences).

4.6. Analysis of the data and statistical techniques

The numerical data from the twelve measures in the assessment battery were analysed using quantitative statistical techniques. The Statistical Package for Social Sciences (SPSS) for Windows Version 25 was used to analyse the data. Prior to conducting the main analyses, aimed at answering the research questions, several preliminary analyses were completed in order to determine the reliability and validity of the data collected during the main testing period. This was to ensure that all of the variables (text reading comprehension, sentence

completion, Word Structure, Morpho-Syntactic Structure, Size of Vocabulary, and Depth of Vocabulary in both Sinhala and English languages) continued to show good psychometric properties consistent with the pilot data. Following descriptive statistics (minimum, maximum, mean, and standard deviations) assessing levels of performance for each measure, Pearson correlations (zero-order correlation) were calculated to determine the relationships between the variables: morphology, vocabulary and reading comprehension within the same language and across the languages. Following this, a series of Hierarchical Multiple Regression analyses were performed to explore the roles of morphology and vocabulary in explaining reading comprehension L1 (Sinhala) and L2 (English). The dependent variable in these analyses was reading comprehension and the independent variables were morphology and vocabulary in both Sinhala and English. The Control variables of age and gender were also included in these analyses.

4.7. Data from the main study

As a preliminary step, calculation of Cronbach's alpha, information on the distribution of the scores and correlations between pairs of measures were inspected to establish the reliability and validity of the collected data. The reliability scores of all the measures were acceptable and consistent with the pilot data. The information on the distribution of the scores suggested that there was adequate variability on all measures to answer the research questions. The Correlation results demonstrated positive significant correlations between the pairs of measures assessing the same construct: comprehension, morphology and vocabulary. However, the Sinhala text reading comprehension measure did not show satisfactory correlations with the other measures, more specifically, with the second reading comprehension measure, sentence completion. Therefore, additional investigations were carried out and the findings confirmed the Sinhala sentence completion task as a reading comprehension measure in this study. The

following sections report the preliminary findings of the main study and information of the additional investigations conducted regarding the measure of Sinhala text reading comprehension.

4.7.1. Reliability

Initially, Cronbach's Alpha reliability indices were calculated for each of the measures. These indicated acceptable reliability scores for all the measures that were consistent with the data obtained in the pilot work (see chapter 03). The internal consistency reliability estimated for all the tasks was above 0.77. Table 01 shows the reliability scores for the measures.

Table 4.1.*Internal consistency reliability scores for all the measures*

Tests		No of items	α
English measures			
Comprehension	Reading Comprehension Questions	40	.901
	Reading Comprehension Cloze	50	.949
Morphology	Word Structure	40	.778
	Morpho-Syntactic Structure	50	.936
Vocabulary	Size of Vocabulary	90	.970
	Depth of Vocabulary	160	.921
Sinhala measures			
Comprehension	Reading Comprehension Questions	18	.788
	Reading Comprehension Cloze	35	.906
Morphology	Word Structure	55	.910
	Morpho-Syntactic Structure	70	.872
Vocabulary	Size of Vocabulary	75	.789
	Depth of Vocabulary	160	.952

4.7.2. Descriptive Statistics

Descriptive statistics (minimum, maximum, mean, and standard deviations) of the collected data were calculated to provide summaries about the measures for subsequent interpretations. The analyses indicated that the distribution of the scores for each variable was appropriate for performing the correlational analyses aimed at answering the research questions. The analyses argued against floor and ceiling effects in the data, and suggested that measures were neither too difficult nor too easy for the participants. All measures showed a reasonable range of scores indicating expected variability for the measures and the evidence of the test discrimination. There were no missing data. The descriptive statistics are presented in Table 02.

Table 4.2.*Descriptive statistics for each of the measures*

Tests		Min to Max	Mean	Standard deviation
English measures				
Comprehension	Reading Comprehension Questions	1-38	17.30	7.80
	Reading Comprehension Cloze	3 - 48	24.40	11.05
Morphology	Word Structure	12 – 38	31.74	4.60
	Morpho-Syntactic Structure	7 - 48	28.74	11.41
Vocabulary	Size of Vocabulary	4 – 90	47.31	21.67
	Depth of Vocabulary	14 - 133	82.25	20.37
Sinhala measures				
Comprehension	Reading Comprehension Questions	0 – 18	10.31	3.74
	Reading Comprehension Cloze	3 - 34	20.70	7.00
Morphology	Word Structure	14 - 54	38.96	8.82
	Morph-syntactic structure	17 - 67	55.01	8.40
Vocabulary	Size of Vocabulary	22 - 65	46.65	7.81
	Depth of Vocabulary	48 - 155	130.19	19.46

Note. Min to Max = Minimum to Maximum

4.7.3. Correlation among the measures

Pearson correlations (zero-order correlation) were computed to explore the strength and direction of the relationships between measures that were predicted to measure a common construct: in this case, comprehension, morphology and vocabulary. Correlations were undertaken within each language given that the constructs were meaning-based and hence proficiency may have varied across languages.

4.7.3.1. Correlation among the English measures

Correlations were calculated to explore the degree of associations among the English variables measuring the same common construct. The results demonstrated positive significant correlations between the pairs of measures assessing comprehension, morphology and vocabulary.

The correlation between scores on the Reading Comprehension Questions and Reading Comprehension Cloze measures was positive and significant ($r = .750$ $n = 189$, $p < .001$). This provides evidence that both variables measured a common predicted construct (i.e., reading comprehension).

The correlation between the two morphology variables, Word Structure and Morpho-Syntactic Structure, was also positive and significant ($r = .618$ $n = 189$, $p < .001$) arguing that these two measures were assessing a common predicted construct, that of morphological awareness.

Finally, the two vocabulary measures, used to assess Size and Depth of Vocabulary were also significantly correlated in a positive direction ($r = .517$ $n = 189$, $p < .001$). Again, this result argues for the two measures assessing a common construct, which was predicted to be the vocabulary knowledge of the student.

The results from these correlations demonstrated that the English measures produced the predicted relationship between the measures of a common construct.

4.7.3.2. Correlation among the Sinhala measures

Pearson correlations were computed to assess the patterns of associations among the Sinhala variables measuring the same construct. The results indicated positive significant correlations between the pairs of measures assessing comprehension, morphology and vocabulary.

The correlation between the scores on the Reading Comprehension Questions and the scores on the measure of Reading Comprehension Cloze was positive and significant ($r = .231$ $n = 189$, $p < .001$). Despite this, the size of the correlation between the two measures suggests that there is a great deal of independence between the two measures, which can be argued as providing questionable evidence that both the variables are primarily measuring the single common predicted construct of reading comprehension (this will be discussed further below).

The correlation between the two morphology variables, Word Structure and Morpho-Syntactic Structure, was also positive and significant ($r = .421$ $n = 189$, $p < .001$). A correlation of around .4 was not as large as expected, but it still suggests that these two measures were assessing a common predicted construct, that of morphological awareness, albeit with a reasonable amount of difference in an individual's level of performance on the two measures.

Finally, the two vocabulary measures, used to assess Size and Depth of vocabulary were also significantly correlated in a positive direction ($r = .396$ $n = 189$, $p < .001$). Again, a correlation of around .4 was not as large as expected. However, as with the morphology measures, the two measures would seem to be assessing a common construct, which was predicted to be the vocabulary knowledge of the student, but with a reasonable level of variability in performance across the two tasks.

With the exception of the measures of Sinhala Reading Comprehension Questions and Reading Comprehension Cloze, the Sinhala measures produced medium size correlations (based on Cohen, 1988) consistent with the predicted relationships between measures of the common construct they were designed to assess. Given this evidence, and the fact that the measures were based on previous measures of morphology and vocabulary found in the reading research literature, the measures were considered appropriate for the further analyses. However, the correlational evidence indicated that the comprehension measures required further consideration.

4.7.4. Lack of correlations

The Sinhala Reading Comprehension Questions measure produced a significant (due to the sample size) but small correlation ($r = .231$ $p < .001$) with the Sinhala Reading Comprehension Cloze (correlation sizes were interpreted based on Cohen, 1988). Given that the two measures were supposed to be measuring a common construct (reading comprehension), this size of correlation was unexpected. Additionally, inspection of correlations between the two Sinhala comprehension measures and the two Sinhala vocabulary measures suggested that the Sinhala Reading Comprehension Cloze scores were related to the vocabulary scores, but the Sinhala Reading Comprehension Questions was not (see Reading Comprehension (Cloze) and Size of Vocabulary ($r = .211$ $n = 189$, $p = .004$), and Depth of Vocabulary ($r = .421$ $n = 189$, $p < .001$), and Reading Comprehension (Questions) and Size of Vocabulary ($r = .038$ $n = 189$, $p = .607$) and Depth of Vocabulary ($r = .077$ $n = 189$, $p = .291$)). Again, a correlation between comprehension and vocabulary was expected, which suggested that there may be a problem with the underlying skills involved in the Reading Comprehension Questions measure; i.e., it may be that the Sinhala Reading Comprehension Questions measure involved skills that were not part of those normally used in the performance of comprehending written text.

Therefore, the measure of Sinhala Reading Comprehension Questions was re-examined in order to determine the possible reasons for the unexpected correlations.

4.7.4.1. Inter-rater reliability

About twenty percent of text reading comprehension papers (40 out of 189) that were part of the main study were checked and scored by an independent marker in order to ensure consistency of marking (inter-rater reliability). Before the marking process, all the necessary instructions (clear marking criteria) were provided to the second marker. The results showed some subtle differences mainly related to open-ended questions, but these would not have influenced the results for the whole Sinhala text reading comprehension measure. Therefore, it was unlikely that marking errors were the problem with the Sinhala Reading Comprehension Questions task.

4.7.4.2. Questions only

In any passage comprehension task, questions may inadvertently guide the reading to an appropriate answer. Therefore, poor comprehension of the text may be mitigated by a leading question. In order to determine if this was the problem, a group of 11 native language Sinhala students were given the questions without the passages and asked to write what they thought would be an appropriate answer to the question. The rationale for this was to understand whether the test was measuring reading comprehension or good guessing. The findings indicated that no one could correctly answer any of the questions without having read the passages. Therefore, it seems unlikely that the problem is that the measure was not assessing passage reading in order to answer questions about the contents of the passages.

4.7.4.3. Questions and titles only

A further assessment of the possibility outlined in the previous paragraph was undertaken by giving a group of 6 native language Sinhala students the questions and the titles (theme) for each passage but not the text. Again, if they could answer the questions without the passages, it may be that the test was not measuring text reading comprehension, but rather, guessing based on the general theme of the passage. However, again, the findings indicated that students could not answer any questions based only on the titles. Therefore, the Sinhala text reading comprehension measure did require some level of passage reading for students to answer at least some questions correctly.

4.7.4.4. New measure to a new group of students

Another alternative explanation was that there was something wrong with the passages in the Reading Comprehension measure. Therefore, a new set of passages were derived from a similar source to the original measure; i.e., the Inland-wide Language Training Program conducted by the Department of Official Languages, Sri Lanka. This was given along with the sentence completion measure to a new group of 41 Sinhala speaking students with the aim of determining whether these new texts would produce correlations with the Sinhala sentence completion measure suggesting that both were assessing the common construct of reading comprehension. The new text reading comprehension measure consisted of three passages (similar to the main study passages) and 25 questions (both referential and inferential). The participants were from a similar background to the participants of the main study (the same university and courses) but had not been part of any previous data collection procedures for the current work. However, again the correlation ($r = .217$) between the new text reading comprehension measure and the sentence completion measure was much lower than would be expected if the two measures were assessing the same underlying skills, and was about the

same level as for the previous measure (i.e., the correlation between the first text reading comprehension measure and the sentence completion measure was .231). These findings still suggested that the two measures of comprehension were not measuring a common construct, meaning that further investigations were required.

4.7.4.5. A fresh pair of eyes

One procedure that was used to make the Sinhala text reading comprehension measure appropriate for the content of the current study, was to take reading passages from previously administered tests: i.e., the country's national examinations. Because these were tests developed by educationalist within the country, they were not reviewed as other measures in the study; the assumption being that the review would have occurred as part of the development of the national examinations. Therefore, because of the potential problems with the two text measures, an expert who is a native speaker of the Sinhala language was asked to review the passages used in the study.

After the review, the reviewer stated that the reading comprehension measure was relatively well developed in terms of the format with comprehension questions and passages being about various disciplines. However, she considered that some of the passages, and their questions, were heavily reliant on content knowledge rather than general language ability. This may have led to those with lower levels of content knowledge performing less well on the questions despite good levels of reading comprehension. As such, the lack of correlation between the two comprehension measures may have been due to one measure assessing comprehension (the sentence completion task) but the other measuring a combination of comprehension and content knowledge.

However, it was not clear whether elimination of the questions in the text comprehension measure would lead to more consistency in performance across the two comprehension measures. Therefore, an alternative measure of text reading comprehension was considered.

4.7.4.6. Translated passages

It was vital to find evidence to confirm the validity of the sentence completion measure as a measure of reading comprehension in this study. Therefore, given that the English text reading comprehension measure seemed to be showing expected correlations, it was decided to translate two of the English passages, and the 20 questions associated with those passages, into Sinhala and test them along with the Sinhala sentence completion measure with a new group of 31 native speaking Sinhala students to examine whether the Sinhala sentence completion measure could be argued as measuring reading comprehension in a predictable way. This translation was done by the researcher and reviewed by a subject-related expert. As previously, the 31 students had been involved in any previous data collection procedures as part of this study, but from the same university and had undertaken similar courses to those in the main study of this thesis. After collecting these data, correlations between the two measures were calculated and a significant moderate correlations ($r = .40$) produced. This suggested that these two measures were measuring something in common (i.e., reading comprehension). However, inspection of some of the translated questions made it necessary to reconsider items on the translated comprehension measure further.

It was found that three items (items, 1, 10 and 15) did not show the same correlations with other items in the translated measure and were not correlated with the total score of the sentence completion measure. Item 15 in its Sinhala translation was too easy and nearly all students got it right. Therefore, this item was deleted from the final test score. Items 1 and 10 were also deleted as re-inspection of the translation of the questions suggested that they were not giving

the expected sense. When these three items were deleted from the translated reading comprehension measure, the correlation with the sentence completion task increased to $r = .54$ (which was positive and statistically significant). This correlation suggested that these two comprehension measures were measuring a common construct, reading comprehension.

Given that the Sinhala Reading Comprehension Cloze was found to be related to another measure which would be expected to be assessing reading comprehension, and given that it was developed as a measure of reading comprehension consistent with similar measures used within studies of reading comprehension, then this study will use the sentence completion measure to determine likely relationships between the other measures in the study and reading comprehension: the evidence suggests that it is likely to be a valid measure of reading comprehension.

All in all, in this study, based on the preliminary findings, it was decided to perform the rest of the analyses with the scores of all the measures except the Sinhala Reading Comprehension Questions measure to determine potential answers to the research questions. The findings of the rest of the analyses are reported in following sections.

4.8. Correlations between measures included within the assessment battery

4.8.1. Correlations between dependent variables and independent variables

Pearson product-moment correlation coefficients were computed within each language (Sinhala and English) to assess the relationships between the dependent variables (reading comprehension: Cloze and Questions) and the independent variables (Word Structure, Morpho-Syntactic Structure, Size of Vocabulary and Depth of Vocabulary) used in this study. Correlation results demonstrated that all of the variables were significantly correlated with reading comprehension.

For Sinhala Reading Comprehension (Cloze), both morphology, in the form of Word Structure ($r = .491$ $n = 189$, $p < .001$) and Morpho-Syntactic Structure ($r = .349$ $n = 189$, $p < .001$), and vocabulary, measured via Size of Vocabulary ($r = .211$ $n = 189$, $p = .004$) and Depth of Vocabulary ($r = .421$ $n = 189$, $p < .001$), showed significant positive correlations. These results are presented in Table 4.3.

Table 4.3.

Pearson product-moment correlations between Sinhala reading comprehension (Cloze) and all other Sinhala measures used in the study

	Reading Comprehension Cloze
Word Structure	.491**
Morpho-Syntactic Structure	.349**
Size of Vocabulary	.211**
Depth of Vocabulary	.421**

** $p < .01$.

Similarly, English reading comprehension (Cloze) was significantly positively correlated with morphology, as measured by: Word Structure ($r = .568$ $n = 189$, $p < .001$) and Morpho-Syntactic Structure ($r = .810$ $n = 189$, $p < .001$), and vocabulary, in the form of: Size of Vocabulary ($r = .849$ $n = 189$, $p < .001$) and Depth of Vocabulary ($r = .461$ $n = 189$, $p < .001$). Furthermore, English reading comprehension (Questions) was significantly positively correlated with morphology: Word Structure ($r = .507$ $n = 189$, $p < .001$) and Morpho-Syntactic Structure ($r = .760$ $n = 189$, $p < .001$), and vocabulary knowledge: Size of Vocabulary ($r = .753$

$n = 189$, $p < .001$) and Depth of Vocabulary ($r = .409$ $n = 189$, $p < .001$). These results are displayed in Table 4.4.

Table 4.4.

Pearson product-moment correlations between English reading comprehension (Cloze and Questions) and all other English measures used in the study

	Reading Comprehension Cloze	Reading Comprehension Questions
Word Structure	.568**	.507**
Morpho-Syntactic Structure	.810**	.760**
Size of Vocabulary	.849**	.753**
Depth of Vocabulary	.461**	.409**

** $p < .01$

4.8.2. Correlations between morphology and vocabulary

In addition to the correlations between the dependent variables and the independent variables, further correlations were performed between morphology (Word Structure and Morpho-Syntactic Structure) and vocabulary knowledge (Size of Vocabulary and Depth of Vocabulary) in both Sinhala and English. The results indicated that there were significant positive correlations between all morphology measures and vocabulary measures.

The correlation results demonstrated that Sinhala Word Structure was significantly positively correlated with performance on Sinhala Size of Vocabulary ($r = .163$ $n = 189$, $p = .005$) and

Sinhala Depth of Vocabulary ($r = .445$ $n = 189$, $p < .001$). Sinhala Morpho-Syntactic Structure was significantly positively correlated with performance on Sinhala Size of Vocabulary ($r = .369$ $n = 189$, $p < .001$) and Sinhala Depth of Vocabulary ($r = .565$ $n = 189$, $p < .001$). Similarly, scores achieved of the English Word Structure were significantly positively correlated with scores obtained on the English Size of Vocabulary ($r = .670$ $n = 189$, $p < .001$) and scores obtained on the English Depth of Vocabulary ($r = .334$ $n = 189$, $p < .001$). English Morpho-Syntactic Structure was significantly positively correlated with English Size of Vocabulary ($r = .894$ $n = 189$, $p < .001$) and English Depth of Vocabulary ($r = .421$ $n = 189$, $p < .001$).

4.8.3. Correlations across languages: Sinhala and English

Pearson correlations were also performed to assess whether there were relationships between Sinhala morphology measures and English reading comprehension measures (Cloze and Questions), and English morphology measures and Sinhala reading comprehension measure (Cloze). The results indicated significant positive correlations between English reading comprehension (Cloze) and Sinhala Word Structure ($r = .449$ $n = 189$, $p < .001$) and Morpho-Syntactic Structure ($r = .379$ $n = 189$, $p < .001$), and between the English Reading Comprehension (Questions) and Sinhala Word Structure ($r = .261$ $n = 189$, $p < .001$) and Morpho-Syntactic Structure ($r = .311$ $n = 189$, $p < .001$). There were also significant positive correlations between Sinhala Reading Comprehension (Cloze) and English Word Structure ($r = .185$ $n = 189$, $p = .011$) and Morpho-Syntactic Structure ($r = .208$ $n = 189$, $p = .004$). These results are displayed in Table 4.5.

Table 4.5.

Correlations between the measures of Sinhala morphology and English reading comprehension (Cloze and Questions), and the measures of English morphology and Sinhala reading comprehension (Cloze)

Sinhala Morphology	English Reading Comprehension	
	(Cloze)	(Questions)
Word Structure	.449**	.261**
Morpho-Syntactic Structure	.379**	.311**
English Morphology	Sinhala Reading Comprehension	
	(Cloze)	
Word Structure	.185*	
Morpho-Syntactic Structure	.208**	

* $p < .05$. ** $p < .01$.

The results of these correlations argue for cross-language relationships between Sinhala and English. However, it was noted that the correlations between Sinhala morphology and English reading comprehension (Cloze and Questions) were larger than those between English morphology and Sinhala reading comprehension.

Overall, the results indicated that morphology and vocabulary were significantly positively correlated. Morphology and vocabulary were also correlated with reading comprehension in both languages. Finally, morphology in one language was significantly positively correlated with reading comprehension in the other.

4.9. Hierarchical multiple regression analyses

Results from the correlation analyses demonstrated positive relationships between morphological awareness and reading comprehension, morphological awareness and vocabulary knowledge, and vocabulary knowledge and reading comprehension. Therefore, this section further investigated whether morphological awareness directly predicts variability in reading comprehension and indirectly predicts variability in reading comprehension via vocabulary knowledge in the same language. In addition, results from the correlations indicated significant positive relationships between morphological awareness and reading comprehension across languages. Therefore, this section also examined whether morphological awareness predicts reading comprehension across languages besides in the same language.

Hierarchical multiple regression analyses were used to assess the level of prediction of reading comprehension provided by various measures in the assessment battery. Both reading comprehension measures (Cloze and Questions) in Sinhala and English were used as the dependent variables (DV) throughout the regression analyses. The measures of morphology and vocabulary in Sinhala and English were used as the independent variables (IVs). Given that gender and age have influence on language skills (Goh & Foong, 1997; McKay & Wong, 1996; Pavlenko, 2000; Siebert, 2003), gender and age (in years) of participants and years of learning English were entered into the model each time in the first step to act as a control. The variable ‘years of learning English’ was performed only with English measures to control for

the influence of years of learning English. Similar regression analyses procedure was followed for the both languages: Sinhala and English.

Six sequential regression analyses: 2 sequential regression analyses for Sinhala reading comprehension (Cloze), 2 sequential regression analyses for English reading comprehension (Cloze), and 2 sequential regression analyses for English reading comprehension (Questions), were performed to assess direct and indirect contribution of morphological awareness to L1 and L2 reading comprehension.

4.9.1. Direct and Indirect relationship between Sinhala (L1) morphological awareness and Sinhala reading comprehension (Cloze)

The first regression analysis focused on the ability of L1 morphology to predict variance in L1 reading comprehension. In this regression, Reading Comprehension (Cloze) measure was used as the dependent variable, with Word Structure and Morpho-Syntactic Structure entered as independent variables after controlling for the influence of gender and age (in years). Table 4.6 presents the results of this analysis.

Table 4.6.

Results of a hierarchical regression analysis to investigate the relationship between L1 (Sinhala) morphological awareness L1 reading comprehension (Cloze)

Variables	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender and Age	.001	.001	F=.084	Gender	.043
			$p = .919$	Age	.024
2. Morphology	.268	.267	F=33.63	Word Structure	.412
			$p < .001$	Morpho-Syntactic Structure	.185

Note. Final Beta represents the unique contribution of each variable

The results indicated that L1 morphology was statistically significant and accounting for approximately 27 percent of the variance in L1 Reading Comprehension Cloze.

Similar to the first regression analysis, in the second regression, L1 reading comprehension (Cloze) measure was used as the dependent variable. This time Size of Vocabulary and Depth of Vocabulary, followed by Word Structure and Morpho-Syntactic Structure were entered in to the regression after controlling for the influence of gender and age (in years). This analysis investigated whether L1 morphology still predicted L1 reading comprehension after controlling for the influence of L1 vocabulary. These results are displayed in Tables 4.7.

Table 4.7.

Results of a hierarchical regression analysis to investigate the relationships between L1 (Sinhala) morphological awareness and L1 reading comprehension (Cloze), and L1 vocabulary and L1 reading comprehension (Cloze).

Variable	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender and Age	.001	.001	F=.084 p=.919	Gender	.039
				Age	.035
2. Vocabulary	.184	.183	F=20.69 p<.001	Size of Vocabulary	.048
				Depth of Vocabulary	.205
3. Morphology	.300	.116	F=15.10 p<.001	Word Structure	.360
				Morpho-Syntactic Structure	.072

The results showed that the vocabulary measures produced a statistically significant result, with vocabulary explaining approximately 18 percent of the variance in reading comprehension. Entry of the morphology measures also produced a statistically significant result with morphology explaining approximately an additional 12 percent of the variance in reading comprehension above and beyond that of L1 vocabulary.

Depth of Vocabulary produced a higher Beta value ($\beta = .205$, $p = .012$) than Size of Vocabulary ($\beta = .048$, $p = .485$). Therefore, the Depth of Vocabulary measure seemed to be more predictive of L1 reading comprehension (Cloze) than the measure of Size of Vocabulary, which may suggest that these readers rely more on Depth of Vocabulary than Size of Vocabulary to support the processes in the Cloze reading comprehension task (this will be discussed in the next chapter). Additionally, in terms of the morphology measures, the beta scores in the final model indicated that only Word Structure was statistically significant (for the Word Structure task, $\beta = .360$, $p < .001$) compared to the Morpho-Syntactic Structure task $\beta = .072$, $p = .376$). Therefore, the Word Structure measure seemed to be more predictive of L1 reading comprehension (Cloze) than the measure of Morpho-Syntactic Structure, which may suggest that these readers rely more on individual word processing than combining words within phrases and sentences in a sentence level reading comprehension task.

Overall, the findings indicated that L1 reading comprehension was predicted by morphology and vocabulary. In addition, L1 morphology predicts reading comprehension independent of the influence of L1 vocabulary. In the first regression, L1 morphology explains about 27 percent of the variance in L1 reading comprehension. In the second regression, L1 morphology explains about 12 percent of the variance in L1 reading comprehension controlling for vocabulary, which indicates the direct association between L1 morphology and L1 reading comprehension independent of vocabulary. The difference between model 2 of the first regression and model 3 of the second regression was approximately 15 percent, which is indicative of the indirect relationship between L1 morphology and L1 reading comprehension via vocabulary.

In conclusion, the analyses suggested that L1 morphological awareness directly contributes to L1 reading comprehension (Cloze) independent of vocabulary knowledge. On the other hand, the analyses found that L1 morphological awareness also indirectly contributes to L1 reading

comprehension via vocabulary knowledge. The indirect relationship between L1 morphological awareness and L1 reading comprehension is marginally larger than the direct relationship.

4.9.2. Direct and Indirect relationship between L2 (English) morphological awareness and L2 reading comprehension (Cloze)

This section examined whether L2 morphological awareness directly predicted L2 reading comprehension (the Cloze task), independent of L2 vocabulary, or indirectly predicted L2 reading comprehension via vocabulary knowledge. Two sequential regression analyses were performed as in the previous sub-section. In the first regression, reading comprehension measure was used as the dependent variable with the Word Structure and the Morpho-Syntactic Structure task entered after controlling for the influence of gender, age (in years) and years of learning English (YLE). The results are displayed in Tables 4.8.

Table 4.8.

Results of a hierarchical regression analysis to investigate the relationship between L2 (English) morphological awareness and L2 reading comprehension (Cloze)

Variables	R ²	R ² Change	Sig. R ² Change	Final Beta	
1. Gender, Age and YLE	.055	.055	F=3.59 p=.015	Gender	-.057
				Age	.072
				YLE	.026
2. Morphology	.672	.617	F=172.42 p<.001	Word Structure	.101
				Morpho-Syntactic Structure	.739

YLE = years of learning English

The findings showed that L2 morphology was statistically significant, accounting for approximately 62 percent of the variance in L2 reading comprehension (Cloze).

Similar to the first regression model, in the second regression, L2 reading comprehension (Cloze) measure was used as the dependent variable, with Size of Vocabulary and Depth of Vocabulary and Word Structure and Morpho-Syntactic Structure entered in a prescribed order after controlling for the influence of gender, age (in years) and years of learning English (YLE). These results are displayed in Tables 4.9.

Table 4.9.

Results of a hierarchical regression analysis to investigate the relationships between L2 (English) morphological awareness and L2 reading comprehension (Cloze), and L2 vocabulary and L2 reading comprehension (cloze)

Variable	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender, Age and YLE	.055	.055	F=3.59 p=.015	Gender	-.079
				Age	.034
				YLE	-.015
2. Vocabulary	.727	.672	F=225.62 p<.001	Size of Vocabulary	.606
				Depth of Vocabulary	.043
3. Morphology	.741	.014	F=4.88 p=.009	Word Structure	-.018
				Morpho-Syntactic Structure	.268

YLE = years of learning English

The results showed that model 2 was statistically significant with vocabulary explaining approximately 67 percent of the variance in reading comprehension (Cloze). In model 3,

morphology explained approximately an additional 1 percent of the variance in reading comprehension. The findings indicated that morphology did not explain considerable additional variance in reading comprehension above and beyond that of L2 vocabulary. Only L2 vocabulary made a significant contribution to L2 Reading Comprehension Cloze. However, only the Size of Vocabulary measure produced a statistically significant Beta value ($\beta = .606$, $p < .001$), which was much larger than that for the Depth of Vocabulary measure ($\beta = .043$, $p < .334$). Therefore, it appears that these readers rely mainly on their L2 Size of Vocabulary to support their L2 reading comprehension (at least for the Cloze version).

Overall, the findings indicated that L2 reading comprehension was predicted only by vocabulary. Although in the first regression, L2 morphology explained about 62 percent of the variance in L2 reading comprehension, in the second regression, L2 morphology was not statistically significant and explains only about 1 percent of the variance in L2 reading comprehension controlling for vocabulary. This variability indicates the direct relationship between L2 morphology and L2 reading comprehension. The variability difference between model 2 of the first regression and model 3 of the second regression was approximately 61 percent that indicates the indirect relationship between L2 morphology and L2 reading comprehension via vocabulary.

In conclusion, the regression analyses suggested that L2 morphological awareness did not directly contribute to L2 reading comprehension (Cloze) independent of vocabulary knowledge but indirectly contributes to reading comprehension via vocabulary knowledge.

4.9.3. Direct and Indirect relationship between L2 (English) morphological awareness and L2 reading comprehension (Questions)

Similar to the above analyses, two sequential multiple regression analyses were performed to assess the direct and indirect relationship between L2 morphological awareness and L2 reading comprehension (the Questions version of the reading comprehension measures). In the first regression, reading comprehension (Questions) measure was used as the dependent variable with Word Structure and Morpho-Syntactic Structure entered after controlling for the influence of gender, age (in years) and years of learning English (YLE). These results are displayed in Table 4.10.

Table 4.10.

Results of a hierarchical regression analysis to investigate the relationship between L2 (English) morphological awareness and L2 reading comprehension (Questions)

Variables	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender, Age and YLE	.058	.058	F=3.79		
			p=.011		
				Gender	-.074
				Age	.144
				YLE	-.045
2. Morphology	.601	.543	F=124.50		
			p<.001		
				Word Structure	.049
				Morpho-Syntactic	
				Structure	.724

YLE = years of learning English

The results demonstrated that L2 morphology was statistically significant and accounted for approximately 54 percent of the variance in L2 reading comprehension (Questions).

Similar to the first regression analysis, in the second regression, the L2 reading comprehension (Questions) measure was used as the dependent variable with Size of Vocabulary and Depth of Vocabulary; then Word Structure and Morpho-Syntactic Structure, entered in a prescribed order after controlling for the influence of gender, age (in years) of participants and years of learning English. These results are displayed in Tables 4.11.

Table 4.11.

Results of a hierarchical regression analysis to investigate the relationships between L2 (English) morphological awareness and L2 reading comprehension (Questions), and L2 vocabulary and L2 reading comprehension (Questions)

Variable	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender, Age and YLE	.058	.058	F=3.79 p=.011	Gender	-.086
				Age	.124
				YLE	-.069
2. Vocabulary	.585	.527	F=116.09 p<.001	Size of Vocabulary	.325
				Depth of Vocabulary	.058
3. Morphology	.626	.041	F=9.91 p<.001	Word Structure	-.019
				Morpho-Syntactic Structure	.459

YLE = years of learning English

The results showed that model 2 was statistically significant with vocabulary explaining approximately 53 percent of the variance in reading comprehension (Questions). Model 3 was

also statistically significant with morphology explaining approximately an additional 4 percent of the variance in reading comprehension above and beyond that of L1 vocabulary.

Similar to the analysis of the relationship between L2 morphology and L2 reading comprehension (Cloze), in this analysis, of the two vocabulary measures, only Size of Vocabulary produced a statistically significant Beta value ($\beta = .325$, $p < .007$), compared to that for Depth of Vocabulary ($\beta = .058$, $p < .285$). Additionally, of the two morphology measures, only Morpho-Syntactic Structure showed a statistically significant Beta value ($\beta = .459$, $p < .001$), whereas the Word Structure measure did not ($\beta = -.019$, $p = .759$). These beta scores suggest that readers rely more on Size of Vocabulary than Depth of Vocabulary in Reading Comprehension (Questions), and more on combining of words within phrases and sentences than individual word processing in a passage level reading comprehension task.

The results indicated that L2 reading comprehension was predicted by morphology and vocabulary, and that L2 morphology predicts a small amount of passage level reading comprehension independent of the influence of L2 vocabulary. In the first regression, L2 morphology explained about 54 percent of the variance in L2 reading comprehension. In the second regression, L2 morphology explained about 04 percent of the variance in L2 reading comprehension controlling for vocabulary. This variability indicates the direct relationship between L2 morphology and L2 reading comprehension. The variability difference between model 2 of the first regression and model 3 of the second regression was approximately 50 percent that indicates the indirect relationship between L2 morphology and L2 reading comprehension (Questions) via vocabulary.

Overall, the analyses suggested that L2 morphological awareness has primarily an indirect influence via vocabulary knowledge on English (L2) reading comprehension (Questions), and

a small but significant direct influence of morphology on English reading comprehension independent of vocabulary knowledge.

4.9.4. Cross-language relationship between morphological awareness and reading comprehension

The second research question was designed to investigate whether Sinhala (L1) morphological awareness supports English (L2) reading comprehension and English (L2) morphological awareness supports Sinhala (L1) reading comprehension. To answer this research question, first, correlation analyses were performed to assess whether there were relationships between Sinhala morphology measures and English reading comprehension measures, and English morphology measures and Sinhala reading comprehension measure (see 4.8.3.) Then, hierarchical multiple regression analyses were performed to assess the ability of Sinhala morphology measures in predicting English reading comprehension, and the ability of English morphology measures in predicting Sinhala reading comprehension.

4.9.4.1. Influence of Sinhala (L1) morphology on English (L2) reading comprehension (Cloze)

A hierarchical regression analysis was performed to assess the ability of Sinhala morphology in predicting English reading comprehension (Cloze). In this analysis, the measure of English reading comprehension was used as the dependent variable, while the measures of Sinhala morphology were used as the independent variables. Potential predictor variables were then entered in a prescribed order. Gender and age (in years) of the participants were entered to control for the effects of the variables. These were followed by the measures of English morphology. Finally, the measures of Sinhala morphology were entered. Table 4.12 presents the results of this hierarchical regression analysis.

Table 4.12.

Results of a hierarchical regression analysis to investigate the influence of (L1) Sinhala morphological awareness on (L2) English reading comprehension (Cloze)

Variable	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender and Age	.038	.038	F=3.70 p=.026	Gender	-.057
				Age	.098
2. English Morphology	.672	.633	F=177.57 p<.001	Word Structure	.050
				Morpho-Syntactic Structure	.697
3. Sinhala Morphology	.704	.032	F=9.84 p<.001	Word Structure	.185
				Morpho-Syntactic Structure	.028

Results obtained from this analysis indicated that English morphology was statistically significant, explaining approximately 63 percent of the variance in English reading comprehension. Additionally, the results demonstrated that Sinhala morphology measures

were also statistically significant, explaining approximately an additional 03 percent of the variance in English reading comprehension. This suggested that the addition of Sinhala morphology increased the level of prediction of English reading comprehension (Cloze).

4.9.4.2. Influence of Sinhala (L1) morphology on English (L2) reading comprehension (Questions)

A similar hierarchical regression analysis was also performed to assess the ability of Sinhala morphology in predicting English reading comprehension (Questions) using the comprehension measure as the dependent variable and entering the potential predictor variables in the same prescribed order. First, gender and age (in years) of the participants were entered into the model in the first step to control for the influences of these variables. Then, the English morphology measures were entered in step 02 and explained 54 percent of the variance in English reading comprehension (Questions). Finally, the Sinhala morphology measures were entered in step 03, but they did not explain significant amount of the variance in English reading comprehension (Questions). These results are displayed in Table 7.13.

Table 4.13.

Results of a hierarchical regression analysis to investigate the influence of (L1) Sinhala morphological awareness on (L2) English reading comprehension (Questions)

Variable	R ²	R ² Change	Sig. R ² Change		
				Final Beta	
1. Gender and Age	.055	.055	F=5.40 <i>p</i> <.005	Gender	-.062
				Age	.131
2. English Morphology	.599	.544	F=124.94 <i>p</i> <.001	Word Structure	.047
				Morpho-Syntactic Structure	.708
3. Sinhala Morphology	.600	.001	F=.237 <i>p</i> =.789	Word Structure	-.009
				Morpho-Syntactic Structure	.038

The results obtained from this analysis indicated that only the measures of English morphology were statistically significant. The measures of Sinhala morphology were not statistically significant, and they did not explain variance in the English Reading Comprehension Questions

measure. This suggested that the addition of Sinhala morphology did not increase the level of predication of English reading comprehension (Questions), and as a result, Sinhala morphology does not support English reading comprehension (Questions).

4.9.4.3. Influence of English (L2) morphology on Sinhala (L1) reading comprehension (Cloze)

Given that there was evidence of cross-language influences in the Cloze comprehension measure, with Sinhala morphological skills explaining additional variance over that explained by the English measures, further analyses were performed to determine if this effect was bi-directional between the two languages. Therefore, similar hierarchical regression analysis was performed to assess the ability of English morphology to predict variability in the Sinhala Cloze reading comprehension measure. In this analysis, the Sinhala reading comprehension measure was used as the dependent variable, and the predictor variables were entered in a prescribed order. First, gender and age (in years) of participants were entered in step 01 to control for the influences of these variables. Then, the Sinhala morphology measures were entered in step 02 and explained 27 percent of the variance in Sinhala reading comprehension (Cloze). After entry of the English morphology measures at step 03, no further significant levels of variance in the Sinhala reading comprehension (Cloze) were explained. These results are displayed in Table 4.14.

Table 4.14.

Results of a hierarchical regression analysis to investigate the influence of (L2) English morphological awareness on (L1) Sinhala reading comprehension (Cloze)

Variable	R ²		Sig.		Final Beta
	R ²	Change	R ²	Change	
1. Gender and Age	.001	.001	F=.084 p=.919	Gender	.043
				Age	.027
2. Sinhala Morphology	.268	.267	F=33.63 p<.001	Word Structure	.420
				Morpho-Syntactic Structure	.188
3. English Morphology	.269	.001	F=.099 p=.906	Word Structure	-.035
				Morpho-Syntactic Structure	.010

The results obtained from this analysis indicated that only the measures of Sinhala morphology were statistically significant. The measures of English morphology were not statistically significant, and they did not explain additional variance in Sinhala reading comprehension (Cloze). This suggested that the addition of English morphology did not increase the level of

predication of Sinhala reading comprehension (Cloze), and as a result, English morphology does not support Sinhala reading comprehension (Cloze).

Overall, the analyses suggested that although English morphology did not increase the level of prediction of Sinhala reading comprehension (Cloze), Sinhala morphology increased the level of predication of English reading comprehension (Cloze). However, Sinhala morphology did not increase the level of predication of English reading comprehension (Questions).

4.10. Summary

The analyses of this study aimed to answer three research questions. Research question one investigated whether there was a direct or indirect (via vocabulary) relationship between Sinhala (L1) morphological awareness and Sinhala reading comprehension. Research question two was to find out whether there was a direct or indirect (via vocabulary) relationship between English (L2) morphological awareness and English reading comprehension. Correlation results indicated that all of the variables were significantly positively correlated. Hierarchical Multiple Regression analyses indicated that L1 morphological awareness directly and indirectly, via vocabulary knowledge, contributed to L1 reading comprehension (Cloze). The findings also demonstrated that L2 morphological awareness contributed only indirectly, via vocabulary knowledge, to L2 reading comprehension (Cloze). However, L2 morphological awareness explained variability in the L2 reading comprehension (Questions) measure both indirectly, via vocabulary knowledge, and to some extent directly, independent of vocabulary knowledge.

Research question three was designed to find out whether morphological awareness predicts reading comprehension across languages. With regard to the relationships between the two languages (Sinhala and English), the findings indicated significant positive correlations between Sinhala morphology and English reading comprehension (Cloze and Questions), and English morphology and Sinhala reading comprehension (Cloze). However, the results of the

regression analyses demonstrated that although Sinhala (L1) morphology predicted additional variability in English reading comprehension (Cloze), it did not predict additional variability in English reading comprehension (Questions). Additionally, English morphology did not predict additional variability in Sinhala reading comprehension (Cloze). These results are discussed in the next chapter (Discussion) with supporting evidence.

CHAPTER FIVE

GENERAL DISCUSSION

5.1. Introduction

This chapter discusses the findings of the current study and draws a number of conclusions. In the following sections of this chapter, an overview of the entire study is provided and key findings of the study are briefly summarised. Then, theoretical implications linking the findings to previous and recent literature are discussed providing potential explanations for the research outcomes. Based on the results illustrated in Chapter 04, interpretation of the findings is provided with reference to the research questions and measures in Chapter 04 and the literature review in Chapter 02. Further, implications of present findings are considered for further research and for educational practices in language teaching and learning environment.

5.2. Summary of the study

The primary objectives of this study were: (i) to investigate the relationships between morphological awareness and reading comprehension in Sinhala (L1); (ii) to investigate relationships between morphological awareness and reading comprehension in English (L2); (iii) to determine whether morphological awareness directly or indirectly (via vocabulary) predicts reading comprehension within the same language; and (iv) to further investigate the relationships between morphological awareness and reading comprehension across languages and whether morphological awareness predicts reading comprehension across languages. To attain these objectives, this study was carried out on English as a Second Language (ESL) adult learners who had been studying at one of public universities in Sri Lanka.

This study was a quantitative investigation including data from eleven assessment measures and a questionnaire completed by 189 Sinhala-speaking university students. The measures were used to assess the participants' performance in language skills including: reading comprehension, morphological awareness, and vocabulary in English and Sinhala. Correlations were computed to assess the relationships among variables within the same language and across the languages. In addition, hierarchical multiple regressions were performed to assess the level of variability predicted by morphological awareness within the same language and across the languages. The findings are summarised below.

5.3. Summary of the Findings

5.3.1. Morphological awareness and reading comprehension in L1 (Sinhala)

The first research question was designed to investigate whether Sinhala (L1) morphological awareness directly predicts L1 reading comprehension or indirectly predicts L1 reading comprehension via vocabulary knowledge. The data from five assessment measures consisting of two morphological awareness measures (Word Structure and Morpho-Syntactic Structure), two vocabulary measures (Size of Vocabulary and Depth of Vocabulary), and one reading comprehension measure (Cloze), were analysed to address this question.

Referring to the correlations, the results demonstrated that morphological awareness was significantly and positively correlated with reading comprehension and vocabulary, and vocabulary was significantly and positively correlated with reading comprehension. The results indicated that these measures were interrelated. The findings from hierarchical regression analyses revealed that L1 morphological awareness directly predicts L1 reading comprehension, over and above vocabulary knowledge and indirectly predicts L1 reading comprehension via vocabulary knowledge. These findings suggest that both morphological awareness and vocabulary contribute to successful reading comprehension in L1 (Sinhala).

5.3.2. Morphological awareness and reading comprehension in L2 (English)

The second research question aimed to examine whether L2 morphological awareness directly predicts L2 reading comprehension or indirectly predicts L2 reading comprehension via vocabulary knowledge. In order to address this question, the data from six assessment measures consisting of two morphological awareness measures (Word Structure and Morpho-Syntactic Structure), two vocabulary measures (Size of Vocabulary and Depth of Vocabulary), and two reading comprehension measures (Questions and Cloze), were analysed. Although data from one Sinhala reading comprehension measure (Cloze) were analysed to address the first research question, data from two English reading comprehension measures were analysed to answer the second reading question (see Chapter 04, sub-section 4.7.3.2.).

The correlation analyses were performed using the scores on the morphological awareness and reading comprehension measures, morphological awareness and vocabulary measures, and vocabulary and reading comprehension measures. Similar to L1 correlation results, these results also indicated that these measures were significantly positively correlated with each other and as a result, they are not independent measures.

The findings of regression analyses indicated that although L2 morphological awareness indirectly contributed to L2 reading comprehension (Cloze) via vocabulary knowledge, it did not directly contribute to L2 reading comprehension (Cloze) independent of vocabulary knowledge. Also, the results demonstrated that L2 morphological awareness primarily indirectly, via vocabulary knowledge, and to some extent, directly independent of vocabulary knowledge, contributed to L2 reading comprehension (Questions).

5.3.3. Morphological awareness and reading comprehension across languages (Sinhala and English)

The third research question asked whether there were significant relationships between morphological awareness and reading comprehension across languages (Sinhala and English) and investigated whether morphological awareness further contributed to any predictability to reading comprehension across languages.

The empirical evidence on the relationships between morphological awareness and reading comprehension across languages indicated that there was a positive correlation across languages between Sinhala morphological awareness and English reading comprehension, and between English morphological awareness and Sinhala reading comprehension. However, it was indicated that the relationships between Sinhala morphological awareness and both English reading comprehension measures (Questions and Cloze) was relatively higher than the relationship between English morphological awareness and Sinhala reading comprehension (Cloze). Further, the association between Sinhala morphological awareness and English reading comprehension (Cloze) was comparatively higher than the relationship between Sinhala morphological awareness and English reading comprehension (Questions).

In addition, the findings of hierarchical multiple regression analyses showed that the addition of Sinhala morphological awareness predicted extra variability in English reading comprehension (Cloze), after controlling for English morphological awareness. However, the addition of Sinhala morphological awareness did not demonstrate the level of prediction of English reading comprehension (Questions) after controlling for English morphological awareness. On the other hand, the addition of English morphological awareness also did not show any contribution to Sinhala reading comprehension (Cloze) after controlling for Sinhala morphological awareness.

In sum, the results suggested that although Sinhala (L1) morphological awareness supported L2 reading comprehension, English (L2) morphological awareness did not support L1 reading comprehension.

5.4. Theoretical implications

Although many studies have provided empirical evidence related to the relationship between children's morphological awareness and reading comprehension (Carlisle, 2000; Kieffer & Lesaux, 2012a; Kirby et al., 2011; Ku & Anderson, 2003; Saiegh-Haddad & Geva, 2008a; Wang et al., 2006), only a few have focused on the relationship between adults' morphological awareness and reading comprehension (Choi, 2015; Dongbo & Koda, 2012; Wilson-Fowler & Apel, 2015). Further, it is hard to find any study that has dealt with morphological awareness and reading comprehension among Sinhala-speaking English language learners. Additionally, even though mostly L1 readers have been concerned in the research of morphological awareness and reading comprehension, L2 readers have been comparatively rarely considered and both L1 and L2 together in one study have been hardly researched. Further, empirical evidence failed to provide conclusive evidence whether morphological awareness directly predicts reading comprehension or indirectly predicts reading comprehension. In order to address this scarcity of research, the contribution of morphological awareness to reading comprehension was investigated among a group of this population. Empirical evidence is provided based on both L1 and L2 data.

The results reported in this thesis are consistent with predictions based on different language data, such as those reported for Spanish (Curinga, 2014), Filipino and Vietnamese (Kieffer & Lesaux, 2012a), and English (Carlisle, 2000). Such findings have important theoretical implications that adds additonal support for the view that morphological awareness contributes directly to reading comprehension as well as indirectly via its relation to vocabualry knowledge

(Kieffer & Lesaux, 2012a). However, according to the results of the current study, it seems that the relationship between morphological awareness and reading comprehension varies according to the reading comprehension measures (i.e., sentence versus passage comprehension requirements) and the language backgrounds (e.g., L1 or L2).

5.4.1. Direct and indirect relationship between L1 (Sinhala) morphological awareness and L1 reading comprehension (Cloze)

The investigation of prediction of L1 morphological awareness in L1 reading comprehension is one of the research purposes in this study. Morphological awareness proved to predict reading comprehension (Cloze), directly controlling for vocabulary knowledge as well as indirectly via vocabulary knowledge in the data presented in this thesis. Consistent with previous studies, the current study provides evidence that L1 morphological awareness and vocabulary knowledge remained crucial in predicting adults' L1 reading comprehension. In this section, the direct and indirect relationships between morphological awareness and reading comprehension of L1 studies from different language backgrounds and different age groups are discussed in order to support the results of the first research question of the current work.

The findings related to the first research question indicated that morphological awareness directly predicts Sinhala reading comprehension. These results are consistent with previous studies of different age groups from children to adults (Carlisle, 2000; Guo et al., 2011a; Katz, 2004; Nagy et al., 2006). For example, Carlisle (2000) examined the relationship between L1 (English) morphological awareness and the reading comprehension of third and fifth graders and suggested that morphological awareness directly contributed to reading comprehension at both grade levels. In line with Carlisle's findings, Katz (2004) investigated the influence of morphological awareness on the reading comprehension of fourth and sixth L1 (English) graders and reported that morphological awareness is a significant direct predictor of reading

comprehension over and above vocabulary. In addition, Nagy et al. (2006) examined the contribution of L1 (English) morphological awareness and vocabulary to reading comprehension among school students from fourth/fifth, sixth/seventh, and eighth/ninth grades. This study suggested that L1 morphological awareness directly contributed to L1 reading comprehension of students from grades four to nine. Further, the findings of Guo et al. (2011a) indicated that adults' morphological awareness uniquely contributed to their reading comprehension.

Moreover, the results of the studies of different language groups (transparent and opaque, alphabetic and non-alphabetic) such as English (Carlisle, 2000; Katz, 2004; Kraut, 2015; Nagy et al., 2006; Wilson-Fowler & Apel, 2015); Chinese (Dongbo & Koda, 2012); Korean (Cho et al., 2011; Wang et al., 2009); French (Casalis et al., 2011); Dutch (Rispen, McBride-Chang, & Reitsma, 2008); Spanish (Curinga, 2014; Goodwin et al., 2013; Kieffer & Lesaux, 2008; Ramirez et al., 2010), and Malayalam (Gafoor, 2013) are in line with the findings related to the first research question of the current study. For example, Ku and Anderson (2003) reported that morphological awareness directly predicts reading comprehension in L1 Chinese and L1 English speaking students. Ku and Anderson's study suggested that morphological awareness predicted the reading comprehension of non-alphabetic language such as Chinese. In addition to results from the study of English and Chinese languages, the current results are in line with the results from study of Korean language, which has transparent orthography. The Korean language is an agglutinative language (Chae, 2013) in which morphemes are more productive and carry more syntactic functions than English (Sohn, 2001) and has a complex morphological system (Wang et al., 2009). In Korean, suffixes are attached to nominal stems, verbal stems, and adjectives. Adjectives, generally require an inflectional suffix to represent a present and past tense in a declarative sentence (known as a statement) (Wang et al., 2009). Further, passive and causative verbal forms can be made by adding suffixes to stem. Around 40 different

suffixes can be attached to the verb stem and approximately 50 noun suffixes are used to mark subject, object, dative, location, direction, source and vocative. Additionally, sentence ending morphemes convey sentence mood (indicative, imperative, interrogative, and pro-positive) and different styles of speech (intimate, familiar, plain, and formal) (see Kim, 1997). Similarly to the Korean language, suffixes of the Sinhala language carry more syntactic functions than the English language. Sinhala also has a complex morphological system in which many verbs and nouns have a fairly large number of morphological forms (Chandralal, 2010; Herath et al., 2007) (see section 2.7).

When the results related to the first research question of the current study are compared with the findings of the prior studies, it can be argued that, despite differences among age groups and language groups, morphological awareness directly contributes to reading comprehension.

Furthermore, the results of the current study indicated that the Word Structure measure seemed to be more predictive of L1 reading comprehension (Cloze) than the measure of Morpho-Syntactic Structure, which may suggest that these readers rely more on individual word processing than combining words within phrases and sentences in a Cloze reading comprehension task. The potential reason for this result may relate to the reading comprehension measure used in the study. This study used only one Sinhala reading comprehension measure (Cloze) (see sub-section 4.7.4) which required less linking of large sections of text than would have been required for passage-level reading comprehension measure. If another Sinhala reading comprehension measure (passage-level) was used, it might be able to suggest the reason for these different results. Future research is necessary to examine whether the relationship between L1 morphological awareness and L1 reading comprehension changes due to reading comprehension measures.

In terms of an indirect relationship between L1 morphological awareness and L1 reading comprehension, the results of the current study are consistent with the results of previous studies (Cho et al., 2011; Curinga, 2014; Nagy et al., 2003; Nagy et al., 2006). For example, the results of the current study concur with the study of Nagy et al. (2006) who examined the contribution of L1 (English) morphological awareness and vocabulary to reading comprehension among school students from fourth/fifth, sixth/seventh, and eighth/ninth grades. This study suggested that L1 morphological awareness indirectly contributed via vocabulary to L1 reading comprehension of students from grades four to nine. Consistent with this study, Cho et al. (2011) reported that morphological awareness of Korean children contributed indirectly to passage level reading comprehension via vocabulary. Further, the current findings mirror and support findings from Curinga (2014) who reported that L1 (Spanish) morphological awareness of ninth and tenth graders made an indirect contribution to reading comprehension via vocabulary in L1 Spanish. Similar to the current study, this study has also used measures of word structure and morpho-syntactic structure in order to assess morphological awareness of the participants. In contrast to the measure of reading comprehension of the current study, this research has administered only a passage-level reading comprehension measure.

However, Guo et al. (2011b) provided contrasting results. They examined the relationships between morphological awareness, vocabulary knowledge, and reading comprehension in English-speaking adults. Their study reported that, although morphological awareness directly related to passage-level reading comprehension, it did not indirectly relate to reading comprehension via vocabulary. One of the possible reasons for these different results may relate to the reading comprehension task used. Although Guo et al utilised a passage-level reading comprehension task to assess the reading comprehension of adults, the current study used a Cloze procedure task. Possibly, the indirect contribution of morphological awareness to

reading comprehension may depend on the demands of the particular reading comprehension task used. Different reading comprehension measures draw on different reading skills (Cutting & Scarborough, 2006; Francis et al., 2006; Keenan, Betjemann, & Olson, 2008). The two reading comprehension measures were distinct in terms of content, format, definitions and methods of answering. More linguistic information is allocated to passage level comprehension compared to a reading comprehension Cloze. Extra textual information is limited in reading comprehension (Cloze) and its information is included in a single sentence. Comprehension largely depends on the reader's ability to understand one sentence at a time (Kibby, 1980). The reader is not required to amalgamate information across sentences (Harris & Sipay, 1980) as passage-level comprehension. In contrast, passage level reading comprehension is an inter-sentence practice in which information comprehended from one sentence influences the processing and comprehending of other sentences in the passage (Becker, 1965; Koen, Becker, & Young, 1969). Passage-level reading is more extensive and it involves more information than the Cloze, which is more intensive. As passage-level reading involves more information, it requires more cognitive processes and as a result, the readers may need to use a variety of reading skills such as morphology and vocabulary. However, both measures should be used in the future research of L1.

Another possible reason for these different results may relate to the writing systems of the two languages, English and Sinhala. English has a relatively deep orthography whereas Sinhala has a relatively shallow one. Hence, L1 English speaking adult learners' morphological awareness may not indirectly contribute to L1 reading comprehension. This notion is consistent with the view of Kuo and Anderson (2006), who argue that the role of morphological awareness in reading comprehension may depend on the writing system of the language (see sub-section 5.4.3 for more information).

Overall, in line with the empirical evidence of the prior studies, the results of the first research question of the current study indicate that L1 morphological awareness directly and indirectly predicted reading comprehension. This accords with the view that morphological awareness contributes to reading comprehension in students from the early school years to university level. As this study indicates that morphological awareness is important in supporting reading comprehension directly and indirectly, then perhaps instruction in meaningful units (morphemes) would support for the L1 learners' reading achievement. Further, morphological skills may be useful component to target for interventions and whole-class instruction to improve reading comprehension in L1 language classrooms.

5.4.2. Direct and indirect relationship between L2 (English) morphological awareness and L2 reading comprehension.

In addition to direct and indirect contribution of L1 (Sinhala) morphological awareness to L1 reading comprehension, direct and indirect contribution of Sinhala-speaking English (L2) language learners' morphological awareness to L2 reading comprehension (Questions and Cloze) was investigated in the current study. The findings demonstrated that L2 morphological awareness only indirectly predicted L2 reading comprehension (Cloze) via vocabulary knowledge, whereas L2 morphological awareness both directly and indirectly predicted L2 reading comprehension (Questions). However, the results of the contribution of morphological awareness to reading comprehension (Questions) suggested that the indirect contribution via vocabulary knowledge is considerably higher than the direct contribution. Generally, the results from this study seems to show that the contribution of L2 morphological awareness to L2 reading comprehension (both Questions and Cloze) is mostly mediated by vocabulary knowledge. Therefore, it could be argued that vocabulary plays a significant role in L2 reading comprehension. In the following sections, while suggesting a tentative conclusion, this finding

is discussed, supporting the conclusions of previous second-language reading comprehension research.

The current study provides the novel finding that the contribution of morphological awareness to reading comprehension is primarily mediated by vocabulary. Most studies that investigate the relationship between morphological awareness and reading comprehension suggest that there is both a direct and an indirect contribution (Kieffer & Lesaux, 2012a; Nagy et al., 2006), but these studies have been conducted with middle school language learners with higher levels of vocabulary knowledge and comprehension skills than the population targeted by the current research.

Given the evidence that different reading comprehension assessments draw on different reading skills (Cutting & Scarborough, 2006; Francis et al., 2006; Fraser, 1999; Keenan et al., 2008; Paribakht & Wesche, 1999), in this study, two reading comprehension measures (Questions and Cloze), with different formats, were used to assess the participants' levels of reading comprehension. The two reading comprehension measures were distinct in terms of content, format, definitions and methods of answering (see Chapter 3). The findings of this study indicated that direct and indirect contribution of L2 morphological awareness to L2 reading comprehension subtly differ across reading comprehension tasks. It seems that different measures of L2 reading comprehension may make differential demands on second language morphology and vocabulary knowledge. This is consistent with Tighe and Schatschneider (2016b), who argue that morphological awareness and vocabulary knowledge are not consistent in different reading comprehension tasks.

The current findings related to the relationship between morphological awareness and reading comprehension (Questions) are in line with prior studies with both ESL children and adolescents from different language backgrounds such as Spanish (Curinga, 2014); Chinese

(Dongbo & Koda, 2012); Korean (Jeon, 2011; Wang et al., 2009); and Filipino and Vietnamese (Kieffer & Lesaux, 2012a). For example, Kieffer and Lesaux (2012a) investigated the direct and indirect contributions of morphological awareness to L2 (English) reading comprehension (Questions) of sixth grade students from diverse L1 backgrounds such as Spanish, Filipino, and Vietnamese. Vocabulary knowledge was employed to investigate the mediated relationship between morphology and reading comprehension. The findings indicated that, regardless of linguistic diversity, morphological awareness made a significant direct contribution to reading comprehension when controlling for vocabulary knowledge and indirect contribution via vocabulary knowledge. However, in this study the Vietnamese ESL learners demonstrated a higher direct and indirect effect than Filipino ESL students. This indicates that the relationship between L2 morphological awareness and L2 reading comprehension may vary according to the students' L1 background.

However, the results of the current study suggest that morphological awareness is only indirectly, via vocabulary knowledge, related to reading comprehension (Cloze). This result is in line with the study of Goodwin et al. (2013) which demonstrated that Spanish-speaking fifth grade English language learners showed only an indirect contribution to English reading comprehension (Cloze) via vocabulary. Although the two studies focused on two different age groups (children and adults), they produced similar indirect influences, which might suggest that, irrespective of age groups, L2 morphological awareness may only indirectly, via vocabulary, predict L2 reading comprehension when the task is focusing on processing information in individual and unrelated sentences (as in the current Cloze based comprehension task).

The lack of direct contribution of L2 morphological awareness in this study may not be due to the measurement of morphological awareness because both inflectional and derivational aspects of morphology were assessed (see the section 3.2.2). In the literature on morphological

awareness and reading comprehension of adults, it is argued that both aspects should be taken into consideration (Carlisle, 1988). Further, the study produced large correlations between morphological awareness and reading comprehension (see chapter 5) suggesting that any inadequate direct contribution to reading comprehension was not simply due to a lack of ability of the study to detect any relationship between the measures.

Furthermore, consistent with previous studies, the current study suggested that second language readers mostly rely on vocabulary knowledge in reading comprehension (Alqahtani, 2015; Droop & Verhoeven, 2003; Huckin, 1992; Kieffer & Lesaux, 2008; Laufer & Nation, 1999; Qian, 1999; Van Gelderen et al., 2007). For example, the present study concurs with the study of Qian (1999). Qian suggested that L2 morphological awareness did not directly contribute to L2 reading comprehension of Chinese and Korean adult ESL readers after controlling for vocabulary knowledge (size and depth). In relation to this result, Dongbo and Koda (2012) showed that morphological awareness of Chinese English language learners predicted passage-level reading comprehension only indirectly via vocabulary knowledge, instead of having a direct prediction. One possible reason for this could be that previous researchers (e.g., Kieffer & Lesaux, 2008; Ku & Anderson, 2003; Nagy et al., 2006), who documented the direct contribution of morphological awareness to reading comprehension, only size of vocabulary was considered, whereas the depth of vocabulary was not considered as an aspect of vocabulary knowledge. In the current study, however, both size of vocabulary and depth of vocabulary were utilized as parts of vocabulary knowledge, which could have strengthened the prediction of vocabulary knowledge to reading comprehension and controlled direct contribution of morphological awareness to reading comprehension.

Another possible reason for more indirect contribution of L2 morphological awareness to L2 reading comprehension via vocabulary knowledge may relate to the age of the participants. Adult L2 readers may be less sensitive to morphological structures in reading comprehension

and more likely to rely on processing morphologically complex words as a whole unit (Clahsen, Felser, Neubauer, Sato, & Silva, 2010). It is argued that adults rely more on non-structural information in constructing meaning from sentences (Felser, Roberts, Marinis, & Gross, 2003; Papadopoulou & Clahsen, 2003). At the age students enter university, different aspects of morphological awareness may have merged and morphological awareness denotes a single construct, which is vocabulary (Tyler & Nagy, 1989; Ullman, 2005). Therefore, adult L2 learners may be less sensitive to word structure and morpho-syntactic structures and may rely heavily on vocabulary in the process of reading comprehension.

Further, adults are presumed to have larger vocabulary knowledge than children (Valdman, 1966). Adult students are exposed to a large number of words in print across their school years and into college, and such exposure should lead to an increase in size of vocabulary (Nagy & Anderson, 1984). Therefore, exposure to L2 is likely to be higher for adult students than for children and adolescents. Thus the main contribution of morphological awareness to reading comprehension may be through the support of vocabulary knowledge. Overall, these potential reasons may account for the lack of direct contribution of L2 morphological awareness to reading comprehension and mostly indirect contribution to reading comprehension via vocabulary knowledge.

However, in the present study, in contrast to the results between L1 morphological awareness and L1 reading comprehension (both directly and indirectly), the empirical evidence between L2 morphological and L2 reading comprehension shows that L2 morphological awareness mostly contributes to L2 reading comprehension through vocabulary knowledge. Further, the results suggest that different measures of L2 reading comprehension may make differential demands on second language morphology and vocabulary knowledge.

5.4.3. Comparative discussion between L1 and L2 morphological awareness and reading comprehension

A significant distinct differences could be identified between the direct and indirect relationship of L1 morphological awareness and L1 reading comprehension, and L2 morphological awareness and L2 reading comprehension. Although L1 morphological awareness directly and indirectly contributed to L1 reading comprehension, L2 morphological awareness mostly indirectly contributed to L2 reading comprehension via vocabulary knowledge. In this section, a few potential reasons for the different results between L1 and L2 morphological awareness and L1 and L2 reading comprehension are discussed in order to support the findings of the current study.

One potential explanation might be students' different levels of morphological sensitivity. It is argued that lack of sensitivity to morphological awareness may influence on successful reading (Diana, 1994). Prior studies of adult second language learners indicate that they may not be as sensitive to morphological information as native speakers (Clahsen & Felser, 2006; Clahsen et al., 2010; Hahne, Mueller, & Clahsen, 2006). In consistent with this view, Babcock, Stowe, Maloof, Brovetto, and Ullman (2008); Neubauer and Clahsen (2009); and Silva and Clahsen (2008) argue that L2 learners do not analyse words like L1 learners in the process of receiving meaning. Therefore, morphological awareness may be less used or absent in the processes of constructing meaning in L2 (Basnight-Brown, Chen, Hua, Kostić, & Feldman, 2007). Instead of relying on morphological structure of words, compared to native speakers, they are more likely to rely on morphologically complex words as whole units (Clahsen et al., 2010), and do not segment inflectional affixes from their stems in the process of constructing meaning from written texts (Neubauer & Clahsen, 2009). Although words are analysed into meaningful units in L1 reading comprehension with the help of morphological awareness, in L2 reading

comprehension words are taken as whole-word representation due to lack of sensitivity to morphemes (Clahsen & Felser, 2006; Clahsen et al., 2010). Similar to this notion, Neubauer and Clahsen (2009) claim that L2 learners may rely more on memorization of words and less on morphological structure of words than native speakers (Neubauer & Clahsen, 2009). It could be argued that as both morphology and vocabulary are meaning-based linguistic elements, when L2 learners are less sensitive to morphological awareness, they may focus on vocabulary, to construct meaning from texts.

Another potential reason may be L2 learners' language proficiency. In general, readers possess and utilize more sophisticated linguistic resources in their L1 than in L2 (Grabe, 2009; Koda, 2007). Language proficiency is required to employ linguistic information in receiving meanings from words (Geva, Wade-Woolley, & Shany, 1997). Language proficiency, which depends on the period of exposure to the language, may possibly relate with morphological sensitivity. Even though L1 learners have considerable exposure to L1, their exposure to L2 language may be relatively low. Highly proficient L2 learners can utilize the target language as would an L1 speaker (Hahne et al., 2006). Further, according to the declarative/procedural model (Ullman, 2005) and the shallow structure hypothesis (Clahsen & Felser, 2006), adult L2 students do not decompose words in the way that native speakers do until they achieve high proficiency level of the target language. Dongbo and Koda (2013) suggest that when overall L2 proficiency increases, the relationship between morphological awareness and reading comprehension also increases. Adult L1 learners may have developed vocabulary knowledge through exposure to spoken and print language, and early spoken language input allows the construction of primary morphological awareness (Koda, 2008). They may possess a broader and better linguistic resource base. Therefore, it may not be surprising that both components, morphology and vocabulary, significantly contributed to L1 reading comprehension among university students given that their L1 morphology and vocabulary should be highly developed

through exposure to the language. Additionally, in this study, although L1 Depth of Vocabulary contributed to L1 reading comprehension, L2 Depth of Vocabulary did not considerably contribute to L2 reading comprehension. This may be because vocabulary depth facilitates reading comprehension with increasing language proficiency (Schwartz & Katzir, 2012). Therefore, relationship between morphological awareness and reading comprehension, whether direct or indirect, may vary dependent on the readers' level of language proficiency, which will be associated with different levels of sensitivity to morphological awareness.

Furthermore, studies on L1 or L2 have suggested that language itself may influence the relationship between morphological awareness and reading comprehension (Carlisle, 2000; Marinova-Todd et al., 2013). The orthographic depth hypothesis (Geva & Siegel, 2000) has been interpreted as arguing that effects of vocabulary are larger in deep orthographies than in shallow orthographies. This is relevant since English has a relatively deep orthography whereas Sinhala has a relatively shallow one: it has a high level of correspondence between phonemes/sounds and graphemes/letters. Hence, vocabulary may influence reading comprehension – more in English (the deeper orthography) than in Sinhala (the more shallow orthography). Further, morphology may be more important in Sinhala reading comprehension than in English reading comprehension because Sinhala is highly inflected (see the section 2.7). This is consistent with the study of Geva et al. (1997), which proposed that morphology was more important in French than in English because French is highly inflected. The direct and indirect morphological awareness in reading comprehension in L1 and L2 may be influenced by how the morphemes are encoded in different writing systems or languages.

All in all, the current data suggested that direct and indirect relationships between morphological awareness and reading comprehension differ between Sinhala as an L1 and English as an L2. Explanations of these differences may relate to factors such as language proficiency, the morphological systems of the languages, and morphological sensitivity, each

of which provides a further area of research investigating direct and indirect relationships between morphological awareness and reading comprehension in L1 and L2.

5.4.4. The relationship between morphological awareness and reading comprehension across languages.

One of the goals of this study was to examine whether a cross-language relationship between morphological awareness and reading comprehension could be established for Sinhala and English. In this study, the term ‘transfer’ is used to indicate cross-language relationship between morphological awareness and reading comprehension. Transfer is defined as “the influence resulting from similarities and differences between the target language and any other language that has been previously (and perhaps imperfectly) acquired” (Odlin, 1989, p. 27).

Comparable tasks in Sinhala and English were administered to assess Sinhala-speaking English language learners’ morphological awareness and reading comprehension. Sinhala morphological awareness and English morphological awareness were significantly, positively correlated, indicating that morphology in these two languages shares some commonalities and as a result, morphology is a reasonably common fundamental linguistic skill. Additionally, the findings demonstrated that there was a significant positive correlation between Sinhala morphological awareness and English reading comprehension, and English morphological awareness and Sinhala reading comprehension. However, it was noted that the correlation between Sinhala morphological awareness and English reading comprehension was relatively higher than the correlation between English morphological awareness and Sinhala reading comprehension. On the other hand, the correlation between Sinhala morphological awareness and English reading comprehension (Cloze) was higher than Sinhala morphological awareness and English passage-level reading comprehension. In relation to the correlation between Sinhala (L1) and English (L2) morphology, the theoretical understanding of the Common

Underlying Proficiency hypothesis by Cummins (1981) appears to give some theoretical explanations with regard to this finding. Cummins claims that when learners improve language skills in one language, irrespective of whether this is in L1 or L2, their language skills develop in both languages. Given the current data for inter-relationships across linguistically different languages, morphological awareness may be one of those skills that can show some level of mutual development across two different languages.

The results from the hierarchical regression analyses exploring the predictive ability of morphological awareness across languages indicated that the addition of Sinhala morphological awareness scores predicted extra variability in English reading comprehension (Cloze), after controlling for English morphological awareness measures. However, the addition of English morphological awareness scores did not influence the level of prediction of Sinhala reading comprehension (Cloze). Further, Sinhala morphological awareness did not explain variance in English passage-level reading comprehension after controlling for English morphological awareness measures. These results suggest that, if transfer is occurring, it is unidirectional between L1 and L2 and potentially limited to sentence-level reading comprehension tasks. This finding may be consistent with the study of Wang et al. (2009), which found that among Korean English second language learners, L1 morphological awareness did not transfer to L2 passage-level reading. Word reading and passage-level reading comprehension measures were used as outcome measures in Wang et al's study. The results showed that, although morphological awareness cross-linguistically transferred to word reading, it did not transfer to passage-level reading comprehension. The Sinhala language and the Korean language are similar in that they both use orthographies that have alphabetic features, and they are both agglutinative languages. These languages are rich in derivational morphology. Also, their morphological systems are structurally and functionally comparable

(see the section 5.4.1). These comparable findings suggest that morphological features of the language may influence the direction of transfer.

However, participants in the study of Wang et al. (2009) were third and fourth grade learners, while in the current study participants were undergraduates, and the level of experience and proficiency may vary across the two groups, making simple comparisons more difficult. Evidence suggests that morphological awareness develops and improves as age progresses (Carlisle, 2000; Katz, 2004; Nagy et al., 2006). Hence, the age of the participants may also be important when discussing these results. Adults have more exposure to language and printed materials than children, and Koda (2008) suggests that, although morphological awareness relates to reading comprehension across orthographies, this relationship changes as children build their language and literacy skills. According to the information from the questionnaire on demographic background used in this study, the participants were all Sinhala native speakers. They were 19 to 24 year old first year university students, which indicated that they had entered the academic environment. Before entering university, the participants had attended formal education at both the primary and secondary levels for an average of 12 or 13 years in Sri Lankan schools. Therefore, based on the participants' age and education backgrounds, it is likely that the participants in this study would have good levels of Sinhala literacy and morphology, which they may be able to apply when reading in any language.

However, there have also been studies that show inconsistent findings compared to those of the current study. For example, Deacon et al. (2007) showed bidirectional transfer of morphological awareness to reading comprehension with a group of French and English speaking children. They suggested that the relationship between cross-language morphological awareness and reading comprehension changes when the learners reach a certain level of language proficiency. Therefore, one possible reason for the observed transfer of morphological awareness from Sinhala to English reading comprehension but not from English

to Sinhala may be the readers' lack of language proficiency in English. Krashen and Terrell (1983) have argued that, in the process of receiving meaning, learners will depend on L1 rules, when new knowledge (L2) is not yet sufficiently developed. Hence, learners who have relatively little experience in L2 may rely on L1 morphological awareness to support L2 reading comprehension. This notion is in line with the views of a number of researchers: both Deacon et al. (2007) and Wang et al. (2006) argued that the direction of transfer is determined by language proficiency. Wang et al. (2006) estimated L2 (English) proficiency level of Chinese bilingual children and the results indicated that their L2 performance was good. The results indicated that after the influence of Chinese predictors had been controlled for, English morphological awareness still contributed to Chinese reading comprehension. They suggested that the transfer from English L2 to Chinese L1 was due to the participant's higher levels of L2 proficiency. Further, Schiff and Calif (2007) emphasised that ESL learners' level of language proficiency is a factor that influences the cross-linguistic relationship between morphological awareness and reading; and Upton and Lee-Thompson (2001) suggested that reliance on the L1 declines as proficiency in the L2 increases. In this study, Upton and Lee-Thompson (2001) tested the level of L2 (English) proficiency of the native speakers of Chinese and Japanese and based on the results, subjects were divided into three groups as Intermediate, Advanced, and Post-ESL students. The results indicated that intermediate ESL students (less proficient) tended to rely on L1 Chinese or Japanese more frequently than the Advanced ESL students, and the Advanced ESL students much more frequently tended to rely on L1 than the post-ESL students in the process of L2 reading comprehension. Further, Lee and Schallert (1997) suggest that cross-language transfer occurs, depending on the degree of L2 proficiency. This study was conducted with middle school and high school L1 Korean students who demonstrated low levels of L2 (English) proficiency and higher levels of L2 proficiency. In this study, it was reported that learners with low levels of L2 proficiency showed little relationship with L1 and

L2 reading skills whereas learners with higher levels of L2 proficiency showed a significant positive relationship between their L1 and L2 reading performance.

Consistent with the proficiency argument above, it has been reported that the English performance of students in Sri Lanka is poor (Subhakaran, 2016; Walisundara & Hettiarachchi, 2015; Wijewardene, Yong, & Chinna, 2014). The Department of Examinations (2011) in Sri Lanka publish the percentage of school students passing English in two national examinations: in the General Certificate of Education (Ordinary Level) of students, and in the General Certificate of Education (Advanced Level) of students, are not at a satisfactory level (Statistical Handbook 2008-2010, Department of Examination, 2011). Further, it is reported that the failure rate of the General Certificate of Education (Advanced Level) Examination in General English within the period 2014-2016 was 60 (Department of Examinations, Subjects Grades Statistics, 2017).

Given that the language proficiency of the reader influences the cross-linguistic transfer, English morphological awareness will not contribute to Sinhala reading comprehension until the ESL learner achieves adequate L2 competency. This is line with the views of Comeau et al. (1999). They claim that it is possible that bidirectional transfer requires similar proficiency levels across the two languages. Consistent with this, Jie et al. (2010) argued that high proficiency learners could transfer their knowledge of morphology from English to Chinese, but this reverse transfer (L2 to L1) occurred only in higher proficiency learners not in lower proficiency learners. Additional evidence for this notion can be found in the studies of Saiegh-Haddad and Geva (2008a) and Schiff and Calif (2007), which also found transfer from a more competent L1 language to less competent L2 language. Therefore, if the Sinhala ESL learners' L2 proficiency level had not reached the appropriate competency level, they may not be able to incorporate their L2 morphological awareness as a useful resource in L1 reading comprehension. Consistent with previous findings, this study suggests that cross-linguistic

transfer may vary according to the learners' language ability, even if the L1 and L2 share some similar linguistic structures (see also Hernandez, Bates, & Avila, 1994; Liu, Bates, & Li, 1992).

In conclusion, the present data suggest that although Sinhala (L1) morphological awareness made a small, unique contribution to English (L2) reading comprehension among Sinhala ESL learners, English morphological awareness did not contribute to Sinhala reading comprehension. One explanation for this is that cross-linguistic relationships between morphological awareness and reading comprehension are influenced by learners' language proficiency level. A certain level of language competency may be needed before transfer occurs between languages. However, in the current study, although Sinhala morphological awareness supports the sentence-level English reading comprehension (the Cloze measure), it does not show the same association with passage-level English reading comprehension. Therefore, even if a learner's language ability influences cross-linguistic transfer between morphological awareness and reading comprehension, it can be argued that this transfer may vary across the reading comprehension tasks. Therefore, factors such as language ability and type of reading measures are important factors to consider in future research and models of language transfer that focus on reading comprehension.

This study advances our knowledge of how morphological awareness relates to reading comprehension across languages, and specifically among Sinhala-speaking adult English language learners. The results add to research indicating that morphological awareness measured in one language is associated with reading comprehension in another language. However, although the present study concentrates on the relationship between morphological awareness and reading comprehension, it does not focus on the causal relationship between these two components. Therefore, causal assertion regarding cross-language transfer of morphological awareness is limited in this study. In future research, clearly, both longitudinal

and intervention studies are required to establish the directionality of the relationship between morphological awareness and reading comprehension across languages: Sinhala and English.

5.5. Educational implications

Overall, findings from the study have educational implications for classroom practice. The relationships found between morphological awareness and reading comprehension, and between vocabulary knowledge and reading comprehension, in both languages, suggests the need of morphological awareness and vocabulary knowledge in reading comprehension in L1 and L2. Therefore, it could be argued that educational programs aimed at developing reading comprehension skills among adult readers should include appropriate, explicit, and systematic instruction on morphological analysis and vocabulary knowledge as it is likely that training students on these components would lead to enhancement of reading comprehension ability.

The findings indicate the need for increased concentration on morphological awareness in reading instruction of learners because morphology becomes increasingly important as contact with academic texts increases (Anglin et al., 1993). From the educational and instructional viewpoints, there is a need for teaching of word knowledge based on morphemic structure and their formation rules (Carlisle & Liberman, 1989; Henry, 1988). Awareness of the morphemic structure of words (Carlisle, 2003) is not acquired automatically (Dongbo & Koda, 2013; Kern, 1989). Therefore, morphological awareness should be directly taught to L1 and L2 learners as a useful reading strategy for constructing meaning from texts. Morphological instruction can draw students' attention to all features of morphologically complex words, their structure, grammar and meaning. If learners are aware of how word formation (elements of words, rules of combination of these elements, and their behaviour) works, they may be able to use this awareness to determine the meanings of words in print. Such awareness may also help the reader derive structural (word structure and sentence structure) and functional information,

which should benefit their comprehension of text. In this context, attention should be given to morphological awareness in reading instruction as instruction on morphology can enhance learners' reading comprehension (Nunes & Bryant, 2006; Reed, 2008; Stahl & Nagy, 2007). When learners are prepared to use morphological awareness, they are capable of determining parts of speech and meanings of new words (Kraut, 2015) which should facilitate the comprehension of texts.

Much can be done by teachers to foster awareness of morphological structure. The learners should practice consistently building words from morphemic units. Carlisle and Fleming (2003) reported that learners are unlikely to analyse words if they do not recognize the morphemic units within the word. Additionally, exposure to printed words also affects the enhancement of morphological awareness (Carlisle, 2000). When students read more books with a greater number of morphologically complex words, they will have more practice and become more adept at recognizing the morphological structure of words (Katz, 2004; McBride-Chang et al., 2008). Increasing exposure to multi-morphemic words (Anglin et al., 1993; Nagy Anderson, 1984) offers more opportunities to develop the ability to conduct morphological analysis. Thus, it can be suggested that giving morphological instruction within a normal classroom setting may be valuable to students to improve their morphological awareness and thus reading comprehension in L1 (Sinhala) and L2 (English). However, intervention-based studies are needed to confirm these interpretations.

Although it has been argued that many teachers are familiar with phonological awareness, they seem to be less familiar with morphological awareness (Moats, 2000; Tong, Deacon, Kirby, Cain, & Parrila, 2011). Carlisle (2003) claims that morphology is neglected in reading instruction due to the lack of educators' knowledge about morphology. If this is the case, then training for teachers regarding morphology will be required prior to improvements in morphological awareness in students. Teaching programmes should be designed for teachers'

professional development in order to strengthen their skills and strategies in giving effective feedback and motivating students to improve their morphological skills. This may equip the teachers in helping the learners to develop an awareness of morphological analysis through explicit teaching. Future research on the effectiveness of teacher training in how to teach morphological awareness in a classroom may be beneficial. However, implanting and planning all these may require language policy change at an institutional level.

In line with the previous studies, the findings of the present study demonstrate that, besides morphological awareness, vocabulary knowledge (size and depth) contributes to adults' reading comprehension in L1 and L2 language. This indicates that vocabulary knowledge (size and depth) plays a critical role in reading comprehension in different languages. Hence, it can be argued that the ability to generate meaning from written texts depends significantly on how many words a student already knows and the quality of those words (how well known). Therefore, it is necessary to equip adult L1 learners, as well as L2 learners, with vocabulary knowledge to improve their reading comprehension.

Vocabulary is a powerful carrier of meaning. Vocabulary is more than just words and developing vocabulary knowledge is a complex process in nature because vocabulary consists of diverse language functions such as phonology, syntactic pattern, semantics and contexts (Perfetti, 2007; Schmitt, 2000). Each word has a specific meaning within a sentence, and an underlying meaning depending on the culture or situation. All these factors should be considered in the process of developing vocabulary knowledge in students for the purpose of reading comprehension as they may be crucial for comprehending texts. The learners should be aware that a word has different functions, particularly in relation to reading comprehension, rather than dictionary meaning. However, vocabulary development is a long-term process. To achieve a large vocabulary, "students need the willingness to be active learners over a long

period of time, for without this, they are unlikely to achieve any substantial vocabulary size, regardless of the quality of instruction” (Schmitt, 2008, p. 333).

Morphological awareness has been shown to predict unique variance in vocabulary knowledge (Bertram, Laine, & Virkkala, 2000; Carlisle, 2007; Mahony et al., 2000). Therefore, morphological awareness may facilitate the development of vocabulary knowledge. Research has shown that the analysis of word forms contributes significantly to vocabulary expansion (White et al., 1989; Nagy & Anderson, 1984; Wysocki & Jenkins, 1987). White et al. (1989) demonstrated that students receiving instruction in the use of word parts not only have greater awareness of prefixes and suffixes but also to applying this awareness in deriving the meanings of difficult words. Teaching many base-words, with attention to the application of morphological principles, improves vocabulary (Bowers & Kirby, 2010). Furthermore, understanding of the behaviour of morphological units may help learners to unravel the meanings of complex words, which may facilitate the development of vocabulary knowledge. Learners should be trained in how to compose and decompose meaningful units of complex words and employ those units to create novel words (Edwards, Font, Baumann, & Boland, 2004). Teaching how to compose words would enhance students’ vocabulary size (Baumann, Edwards, Boland, Olejnik, & Kame’enui, 2003; Leong, 1999). Comprehensive vocabulary training that includes insight into the structure of complex words and the relationships between them is useful to improve vocabulary knowledge in L1 and L2 learners. Providing more opportunities to learners to learn and practice morphological strategies may facilitate growth in vocabulary and reading comprehension over time (Lam et al., 2012).

Sensitivity to the structures of words and sentences is important in vocabulary development and reading comprehension. Students’ morphological awareness and vocabulary knowledge can support their academic success (Beck, McKeown, & Kucan, 2013) by developing their reading comprehension. Therefore, when L1 and L2 syllabi and teaching activities are

designed, educators should consider incorporating skills teaching, such as morphological awareness training, and support vocabulary development activities in their curriculum and class activities. Morphological instruction has the potential to support the development of vocabulary knowledge and reading comprehension, and vocabulary knowledge and reading comprehension will support each other.

Another interesting finding is a positive relationship between morphological awareness in Sinhala and English, which adds to our understanding that there are some commonalities in morphological awareness in Sinhala and English. Therefore, instruction in morphological skills may support reading comprehension in both languages.

In summary, teaching morphological skills and vocabulary in Sinhala and English classrooms would be beneficial. Instruction, guidance and practices can have positive effects on morphological awareness and vocabulary knowledge, and thus reading comprehension. In addition, it is recommended that learners are exposed to the target languages as much as possible. As a result of explicit instructions and regular practice, students are likely to become long-term successful readers (Gaskins, 1994). All in all, it is recommended that in the process of developing reading comprehension, language teachers, material writers, and curriculum designers should consider the incorporation of both component skills of morphology and vocabulary into L1 and L2 curricula.

5.6. Limitations of this research

Although the study addressed the research questions of this thesis, there are some limitations resulting from the measures which should be considered when designing future research.

The main limitation of this study was lack of validity (construct) for the Sinhala passage-level reading comprehension measure, which was one of the variables of this study. As was mentioned earlier in this thesis, although the Sinhala passage-level reading comprehension

measure indicated adequate reliability, it did not show sufficient construct validity (evidence for which would have been the expected correlations with the other measure of comprehension and the measures of vocabulary: see discussions of such construct correlations in (Fuchs, Fuchs, & Maxwell, 1988; Greene, 2001). Therefore, this measure was not included in the main analysis of this study. If data from a Sinhala passage-reading comprehension measure could have been incorporated into the analysis, it would have provided more insight into the role of Sinhala morphological awareness and vocabulary. In addition, more information would have been provided regarding transfer of L2 morphology to L1 reading comprehension.

Though morphological awareness and vocabulary accounted for significant variance in reading comprehension among adult students, considerable variance was left unaccounted for. The study was limited in terms of the measures it could incorporate by the practical concerns of testing time. Measures of world knowledge (Aaron et al., 2008; Hirsch, 2003), and pragmatic (sociolinguistic, sociocultural, and psychological components) (Cutting & Scarborough, 2006; Oakhill, Cain, & Bryant, 2003) have reportedly been important in explaining the variance in reading comprehension. Hence, inclusion of additional measures may provide additional insight into the nature of the relationship between morphological awareness and reading comprehension.

Further, in this study, all the morphological awareness measures (both languages) were conducted in a written format as the participants were adults. It is argued that a written format allows better application of morphological skills for adult readers (Deacon, Parrila, & Kirby, 2008) and a written presentation may avoid their well-established phonological weaknesses (Bowers & Kirby, 2006). Furthermore, it is stated that morphological awareness measures can be presented orally or in writing and morphological awareness can be assessed either of these formats (Deacon et al., 2008). Also, in the literature, it is mentioned that appropriate morphological task design and statistical analysis may provide adequate information of

morphological awareness (Carlisle 2003). Although it was adequate for the interpretations derived, the oral format of morphological awareness measures may provide greater certainty regarding morphological awareness. Therefore, the use of both oral and written formats of morphological awareness measures may be worthy of further attention in future research.

In terms of indirect relationship, in addition to vocabulary, research to date has tended to investigate the contribution of morphological awareness to reading comprehension via word reading skills (Carlisle, 2000; Deacon et al., 2014; Hélène, Tong, & Francis, 2017; Kieffer & Box, 2013; Kieffer & Lesaux, 2008; Levesque et al., 2017; Manolitsis et al., 2017; Perfetti, Landi, & Oakhill, 2005). However, it is not clear whether the effect of morphological awareness on reading comprehension is fully or partially mediated by word reading skills. While some researchers (Deacon et al., 2014; Kieffer & Box, 2013) argue that partially mediated whereby morphological awareness contributes both directly to reading comprehension and indirectly through word reading skills, other researchers (Jarmulowicz, Hay, Taran, & Ethington, 2008) argue that the relationship between morphological awareness and reading comprehension is fully mediated by word reading skills. Further, some other researchers (Carlisle, 2000; Kieffer, Biancarosa, & Mancilla-Martinez, 2013; Kieffer & Lesaux, 2012; Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003; Berninger, & Abbott, 2006) argue that morphological awareness only directly contributes to reading comprehension independent of word reading skills. As a whole, it is debatable whether the relationship between morphological awareness and reading comprehension is mediated by word reading skills or not. However, the participants of the above mentioned studies were children as it is assumed that Children's morphological awareness might initially support reading comprehension through its effects on word reading skills (Deacon, Benere, & Pasquarella, 2013) with more direct effects on reading comprehension for older readers (Perfetti et al., 2005). In line with this notion, the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990)

and some other studies (Catts, Adlof, Hogan, & Weismer, 2005; Mancilla-Martinez, Kieffer, Biancarosa, Christodoulou, & Snow, 2011; Vellutino, Tunmer, Jaccard, & Chen, 2007) suggest that the relative contribution of word reading skills to reading comprehension declines as students grow older, whereas the relative contribution of linguistic comprehension to reading comprehension increases. This argument can be clearly understood with the empirical evidence provided by Landi (2010) based on the study of over 900 university students. This study reports that relative to linguistic comprehension, word reading skills provide a much weaker contribution to reading comprehension among an adult population. As a result, as the participants were adults in this study, the effect of word reading skills may not necessarily explain the variance in reading comprehension among these learners. Therefore, word reading skills was not used in this study in order to examine the direct and indirect relationship between morphological awareness and reading comprehension. However, future research can consider this measure to provide more certain evidence related to the direct and indirect association between morphological awareness and reading comprehension.

This study did not use a measure of language proficiency. Hence, one issue left answered is whether the associations found between morphological awareness and reading comprehension, and between vocabulary knowledge and reading comprehension would change due to students' level of language proficiency. If a measure of language proficiency was controlled, additional information would have been provided with regard to the direct and indirect relationship between morphological awareness and reading comprehension. Further, in the current study, depth of vocabulary did not show a mediated relationship between L2 morphological awareness and L2 reading comprehension. It is possible that the relationship between morphological awareness and reading comprehension would change both within the language and across languages due to the level of L1 and L2 proficiency. In this context, future research can consider a measure to control overall language proficiency to provide more certain

evidence related to the direct and indirect association between morphological awareness and reading comprehension.

5.7. Suggestions for future research

The current analysis fills a gap in the research base by ascertaining the role of morphological awareness and vocabulary knowledge in reading comprehension for Sinhala-speaking English language learners at the university level. The results suggest that morphological awareness in language learning should not be ignored. More studies are clearly needed on the association between morphological awareness and reading comprehension in L1 and L2. For example, research which investigates whether the contributions of morphological awareness and vocabulary knowledge to reading comprehension differ as a function of language proficiency would be useful.

The current study focused on investigating the morphological awareness in Sinhala (L1) and English (L2) of a group of first year university students. Further studies could extend to students with younger age groups (e.g. primary and adolescent students). Such future research could be useful in understanding the utilization of morphological awareness and vocabulary knowledge by different age groups. The information from different age groups will provide further insights into the improvement of reading comprehension of Sinhala students, specifically at different stages of learning, which would be beneficial for teaching morphological awareness and vocabulary knowledge in language classrooms in Sri Lanka in both L1 and L2.

Although regression analysis provides information for the direct and indirect relationships between morphological awareness and reading comprehension, the results of the present study cannot confirm the causal relationship between these two components. As suggested by longitudinal (Kieffer & Lesaux, 2012b; McBride-Chang et al., 2008) and intervention studies

(Bowers, Kirby, & Deacon, 2010b), evidence is needed to establish the impacts of morphological instruction on vocabulary knowledge and reading comprehension. In future intervention-based research, it may be worthwhile to look into the effectiveness of morphological awareness instruction upon Sinhala (L1) and English (L2) reading comprehension. Skills related to the components of morphological awareness should be evaluated before and after direct instruction on them. Additionally, improvements in reading comprehension in the L1 and L2 should also be assessed to determine the likely impact of such training on comprehension skills. Such research may also benefit from controlling vocabulary – as in the current study.

Furthermore, intervention and longitudinal data are needed to investigate whether developing morphological word analysis skills indeed result in better vocabulary and whether this in turn leads to better reading comprehension. The findings from the present study suggest that there is an association between vocabulary knowledge and reading comprehension, and that vocabulary knowledge contributes to successful reading comprehension, particularly in L2. This suggests developing vocabulary knowledge will support reading comprehension. Stahl and Nagy (2007) and Graves (2016) have highlighted morphological awareness as a way to improve native English speakers' vocabulary knowledge. However, more research is needed to determine the effective requirements of such instruction, to identify the circumstances under which such instruction can be useful, and to determine for whom such instruction is most helpful.

5.8. Conclusion

The central purpose of the present thesis research was to explore the direct and indirect contribution of morphological awareness to reading comprehension in Sinhala-speaking adult English language learners.

The empirical evidence of the research reported in this thesis suggests that L1 and L2 reading comprehension levels are predicted by measures of morphology and vocabulary. The study identified morphological awareness as a significant predictor of reading comprehension that directly and indirectly contributes to L1 reading comprehension, but indirectly contributes to L2 reading comprehension via L2 vocabulary knowledge. As morphemes consist of elements of the structure of word, and syntax which account for reading comprehension, morphological awareness may have directly contributed to reading comprehension. On the other hand, as morphology and vocabulary have similar properties, morphology may have indirectly contributed to reading comprehension through vocabulary knowledge.

The findings are in line with the previous findings which have provided evidence for the importance of morphological awareness and vocabulary knowledge in L1 reading comprehension (Curinga, 2014; Goodwin et al., 2013; Guo et al., 2011b; Kieffer et al., 2013; Kieffer & Box, 2013; Kieffer & Lesaux, 2012a) and vocabulary knowledge in L2 reading comprehension (Dongbo & Koda, 2012; Qian, 1999). When the current L1 results are compared with the findings of these previous studies, it is suggested that both direct and indirect contributions of L1 morphological awareness occur across a range of different languages and different ages of the students included in the studies. In contrast, the current L2 results suggest that if there are direct relationships between morphological awareness and reading comprehension, these are likely to be influenced by the type of reading comprehension measure used in the analyses (i.e., those incorporating sentence versus passage comprehension requirements).

Further, the present evidence indicated that Sinhala morphological awareness contributed to English reading comprehension, but English morphological awareness did not contribute to Sinhala reading comprehension. The Sinhala-L1 findings expand current perspectives on cross-linguistic relationships between morphological awareness and reading comprehension. They

further suggest that morphological skills may co-develop and/or support processes in second language linguistic tasks, such as reading comprehension. Such findings are important for theory development (both in terms of reading models but also views of L2 acquisition), but may also provide the basis on which to develop bilingual education practices. The English-L2 findings may be due to the learners' level of language proficiency: i.e., a certain level of language proficiency may be needed before transfer from that language occurs. However, as with direct effects on L2 reading comprehension, transfer effects from L1 to L2 may be influenced by the type of reading comprehension measure used in the research, which future research will need to consider.

Overall, the findings should inform the development of theories of reading comprehension across languages as well as the development of improved models for pedagogical practice.

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APPENDIX A

Dear Sarath,

Thank you for contacting me. Yes, you have my permission to use the morphology instruments. Please let me know if there is another way I can help.

Best,

Rebecca

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APPENDIX B

Hi

Yes, use it. It is available on my website

www.norbertschmitt.co.uk

Norbert

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APPENDIX C

Dear Sarath

Thank you for your message. I am happy for you to use the WAT for your research if you think it will be useful. Are you referring to the "1993" or the "1998" version?

I attach a book chapter which reviews work on the word associates format, in case you haven't seen it.

Regards

John Read

John Read<ja.read@auckland.ac.nz>Oct 27

APPENDIX D

English Reading Comprehension Cloze Test

Test Items

1. The boy was _____ for his bad behaviour.
 - a. helped
 - b. treated
 - c. rewarded
 - d. punished
2. You should _____ your trash in the garbage can.
 - a. throw
 - b. take
 - c. sell
 - d. enter
3. A person may become your _____ if they don't treat you with respect.
 - a. enemy
 - b. friend
 - c. brother
 - d. boss
4. When there is _____ nearby, most animals run away.
 - a. water
 - b. food
 - c. shade
 - d. danger
5. The little frog _____ into the water.
 - a. flew
 - b. ran
 - c. walked
 - d. jumped

6. My friend and I _____ lunch at 12: 00.
- a. play
 - b. do
 - c. drink
 - d. eat
7. I am _____ because I passed my math test.
- a. tired
 - b. upset
 - c. sad
 - d. glad
8. I cannot sleep because my neighbours are being so _____.
- a. happy
 - b. average
 - c. pretty
 - d. noisy
9. Chathura is a great musician; he _____ his guitar in the school band.
- a. helps
 - b. takes
 - c. plays
 - d. sings
10. Five plus two equals _____
- a. six
 - b. seven
 - c. eight
 - d. nine
11. I wear the _____ around my neck.
- a. earrings
 - b. ring
 - c. necklace
 - d. bracelet

12. The month of September comes after the month of _____.
- a. November
 - b. October
 - c. December
 - d. August
13. Someone who plays sports is called _____.
- a. worker
 - b. an athlete
 - c. an artist
 - d. a scientist
14. When I am hungry, I _____.
- a. play soccer
 - b. eat food
 - c. drink water
 - d. watch a movie
15. The big cow _____ more milk than the smaller ones.
- a. eats
 - b. produces
 - c. spoils
 - d. loses
16. Mother says we should not _____ in the house.
- a. walk
 - b. talk
 - c. sleep
 - d. yell
17. The _____ recipe had very few ingredients.
- a. simple
 - b. friendly
 - c. complicated
 - d. strange

18. I love to play with my _____ friend.
- a. boring
 - b. mean
 - c. bad
 - d. best
19. After waking up with a fever and a headache, I knew I must be _____.
- a. healthy
 - b. sick
 - c. happy
 - d. angry
20. Inside the empty box, Kamal found _____.
- a. nothing
 - b. breakfast
 - c. happiness
 - d. something
21. When you _____ something, you get money in exchange for it.
- a. borrow
 - b. sell
 - c. build
 - d. buy
22. We visited many interesting _____ in the historic city.
- a. beaches
 - b. farms
 - c. forests
 - d. places
23. There were many fruits and vegetables for sale at the _____.
- a. market
 - b. meeting
 - c. office
 - d. bank

24. Saman does not like to _____ without a pillow.
- a. laugh
 - b. sleep
 - c. eat
 - d. smile
25. Although there were many boys in the art classroom, there was not a single _____.
- a. adult
 - b. supply
 - c. teacher
 - d. girl
26. _____ must work together to end war, so that we can live together in peace.
- a. Cats
 - b. Birds
 - c. People
 - d. Children
27. My brother is my mother's _____
- a. son
 - b. daughter
 - c. uncle
 - d. father
28. Our _____ makes the rules in our classroom.
- a. officer
 - b. friend
 - c. mother
 - d. teacher
29. The smaller chairs at the dinner table are for the _____
- a. pets
 - b. adults
 - c. kids
 - d. neighbours

30. After having a long and happy _____, he died at age 100.
- a. argument
 - b. operation
 - c. conversation
 - d. life
31. The _____ was ruined by chocolate stains.
- a. hair
 - b. carpet
 - c. pet
 - d. plate
32. The boy stood up and pushed his _____ under the table.
- a. bike
 - b. couch
 - c. chair
 - d. dinner
33. When you _____ numbers, you find the difference between them.
- a. add
 - b. subtract
 - c. multiply
 - d. divide
34. Sudath usually _____ while watching a funny movie.
- a. jumps
 - b. frowns
 - c. sleeps
 - d. laughs
35. After I _____ the door, no one could come in without a key.
- a. closed
 - b. shut
 - c. opened
 - d. locked

36. If you _____ carefully, you can solve many of your problems.
- a. walk
 - b. think
 - c. jump
 - d. remember
37. The new-born baby had _____ toes.
- a. large
 - b. tiny
 - c. green
 - d. good
38. She felt _____ after walking many miles.
- a. strange
 - b. old
 - c. angry
 - d. tired
39. When I need to ride on the airplane, I go to the _____.
- a. station
 - b. store
 - c. airport
 - d. post office
40. Amali was _____ after she received the marriage proposal; it was the happiest moment in her life.
- a. joyful
 - b. sorrowful
 - c. surprised
 - d. estranged
41. Nimal's favorite part about the holidays are all the _____ meals; a joyous occasion calls for great food.
- a. plain
 - b. festive
 - c. beautiful
 - d. decorative

42. It takes _____ hands to hit a target with a bow-and-arrow.
- a. precious
 - b. calloused
 - c. agile
 - d. steady
43. The _____ painting looked remarkably like the original.
- a. ancient
 - b. messy
 - c. phony
 - d. genuine
44. She was very _____ the flies buzzing around her head.
- a. annoyed at
 - b. happy with
 - c. hungry for
 - d. impressed by
45. Although John most often wears casual clothes, he is wearing _____ suit to the wedding.
- a. an old
 - b. a formal
 - c. an ugly
 - d. a proud
46. Air-pollution can cause serious problems for people's
- a. dreaming
 - b. breathing
 - c. timing
 - d. hearing
47. Kavisha _____ the contract because it was not fair.
- a. liked
 - b. accepted
 - c. rejected
 - d. signed

48. Because of my _____, Sumudu is now using the same floor cleaner that I use.
- a. theory
 - b. disapproval
 - c. agreement
 - d. recommendation
49. Though my colleagues were in favour of ending our research, I wanted to _____ it.
- a. abandon
 - b. continue
 - c. delay
 - d. investigate
50. The _____ man was the only one who could lift the heavy load.
- a. nice
 - b. mad
 - c. strong
 - d. ugly

APPENDIX E

Sinhala Reading Comprehension Cloze Test

සිංහල කියවීමේ අවබෝධය සම්බන්ධ පරීක්ෂණය

- 1) දෙපාර්තමේන්තු ප්‍රධානියා _____ ඇමතුවේය.
 1. ශිෂ්‍යයන්
 2. දෙමාපියන්
 3. ගුරුවරුන්
 4. සේවකයන්
- 2) සෞඛ්‍ය _____ ප්‍රතිබෝධකයන් පාලනය කිරීමට අනුමත ඖෂධ සංයෝග භාවිත කළහ.
 1. නිරීක්ෂකයෝ
 2. අධීක්ෂකයෝ
 3. පරීක්ෂකයෝ
 4. ගවේෂකයෝ
- 3) දක්ෂ _____ 1 ශ්‍රේණියට උසස් කරනු ලැබූහ.
 1. කලාකරුවෝ
 2. ලිපිකරුවෝ
 3. මාධ්‍යකරුවෝ
 4. කම්කරුවෝ
- 4) ගුරුවරු උත්තරපත්තර _____ එකඟ වූහ.
 1. නැරඹීමට
 2. ලිවීමට
 3. බැලීමට
 4. ඇගයීමට

5) පරිසර අමාත්‍යාංශය නම කාර්යය _____ ඉටු කරයි.

1. කාර්යක්ෂම
2. සාපේක්ෂව
3. ප්‍රබලව
4. අලසව

6) _____ වින්තිකරු නිදහස් කළේය.

1. ගුරුතුමා
2. විදුහල්පතිතුමා
3. විනිසුරුතුමා
4. නීතිඥතුමා

7) අමාත්‍යවරයා ව්‍යවස්ථාපිත _____ පත් කළේය.

1. පිරිස
2. සංගමය
3. මණ්ඩලය
4. මඩුල්ල

8) ගණකාධිකාරීතුමා ගිණුම් _____ සකස් කරයි.

1. කියවිල්ල
2. ලියවිල්ල
3. වාර්ථාව
4. පොත

9) විදේශ ගතවීමට _____ ලබාගත යුතුය.

1. ගමන් බලපත්‍රයක්
2. ගමන් ලියවිල්ලක්
3. අයදුම් පතක්
4. ප්‍රවේශ පත්‍රයක්

10) දේශීය නිෂ්පාදන _____ විදේශ විනිමය ලැබේ.

1. ආධාරයෙන්
2. කර්මාන්තයෙන්
3. ආනයනයෙන්
4. අපනයනයෙන්

11) කතානායකවරයා මන්ත්‍රීවරුන්ගේ හැසිරීම _____ නොකළේය.

1. ප්‍රසිද්ධ
2. විවාද
3. අනුමත
4. අමතක

12) පාසල් පොත් අධ්‍යාපන අමාත්‍යාංශය විසින් _____ ලැබේ.

1. ලියනු
2. පලකරනු
3. කියවනු
4. සපයනු

13) _____ අධිකරණය විසින් නිදහස් කරනු ලැබූහ.

1. සිරකරුවෝ
2. පෙදරේරුවෝ
3. දෙමාපියෝ
4. ශිෂ්‍යයෝ

14) රක්ෂණ ඔප්පු හිමියා විසින් මුද්දර ගාස්තු _____

1. දෙනු ලැබේ
2. ගෙවනු ලැබේ
3. අයකරනු ලැබේ
4. භාරගනු ලැබේ

15) ඉවක් බවක් නැති ව හැම දෙයකට ම ඇඟිලි ගැසීම නිසා අධිකාරීවරයා සේවකයන් අතරෙහි _____ පත්විය.

1. ප්‍රසාදයට
2. අප්‍රසාදයට
3. අවඥාවට
4. අගතියට

16) රසිකයෝ සම්මානලාභී _____ උණුසුම් ව පිලිගත් හ.

1. ගුරුවරයා
2. කතුවරයා
3. තළවා
4. නවකයා

17) සංස්කෘතික අමාත්‍යාංශය කලා _____ සංවිධානය කරයි.

1. උළෙලක්
2. උත්සවයක්
3. මණ්ඩලයක්
4. මණ්ඩපයක්

18) ඉපැරණි රජ දරුවෝ වැඩි නැතවීම සඳහා ගංගාවන් _____ කළහ.

1. පුළුල්
2. අවුල්
3. හරස්
4. වෙනස්

19) හමුදා සෙබලු කැඩුණු පාලම් _____ කරති.

1. නිර්මාණය
2. නවීකරණය
3. අලුත්වැඩියා
4. ආරම්භ

20) කොල්ලකරුවෝ _____ කඩාවැදී මුදල් පැහැර ගනී.

1. පාසලට
2. පන්සලට
3. බංගලාවට
4. බැංකුවට

21) විශ්වවිද්‍යාල ආචාර්යවරු නවක වදයෙන් තුවාල වූ සිසුවෙකු _____ ගෙන යනී.

1. ගෙදරට
2. පන්තියට
3. රෝහලට
4. පහලට

22) පොදු ජනතාවගේ _____ සඳහා ඇති ස්ථාන ආරක්ෂා කිරීම අප කාගේත් වගකීමකි.

1. පරිභෝජනය
2. සංසරණය
3. පරිහරණය
4. පරිශීලනය

23) උතුරු මුහුදේ බනිජ තෙල් _____ කටයුතු සඳහා විදේශ සමාගම් කිහිපයක් රජයට සහයෝගය දක්වයි.

1. ගවේෂණ
2. විමර්ශන
3. ආදේශන
4. විවක්ෂණ

24) ක්‍රිකට් කණ්ඩායම් ජයග්‍රහණයෙන් _____ ක්‍රීඩකයෝ ඔල්වරසන් දුන්න.

1. පුදුම වුනු
2. උදම් උනු
3. විපරීත උනු
4. උදහස් උනු

25) පුරාණ විහාර බිතු සිතුවම්වල දක්නට ඇත්තේ අපට ම _____ චිත්‍ර සම්ප්‍රදායකැයි විචාරකයෝ කියති.

1. ආවේණික
2. ආරෝපිත
3. ආකස්මික
4. ආරාධිත

26) නව ලේකම්වරයා _____ ඇමතු වේය.

1. බලධාරීන්
2. නිලධාරීන්
3. ප්‍රදේශවාසීන්
4. ගම්වාසීන්

27) අග්‍රවිනිශ්චයකාරවරයා ශ්‍රේෂ්ඨාධිකරණයට _____ නම් කළේය.

1. ගුරුවරුන්
2. විදුහල්පතිවරුන්
3. විනිශ්චයකාරවරුන්
4. විගණකාධිපතිවරුන්

28) _____ අලුත් ශිෂ්‍යයන් ඇතුළත් කර ගැනීම ප්‍රතික්ෂේප කළේය.

1. විගණකාධිපතිවරයා
2. විදුහල්පතිවරයා
3. අග්‍රාමාත්‍යවරයා
4. ඇමතිවරයා

29) නව ක්‍රීඩා සංවිනයක් _____ විසින් ආරම්භ කෙරිණි.

1. සෞඛ්‍ය අමාත්‍යාංශය
2. පරිසර අමාත්‍යාංශය
3. ක්‍රීඩා අමාත්‍යාංශය
4. අධ්‍යාපන අමාත්‍යාංශය

30) වෛද්‍යවරු _____ සුවපත් කරති.

1. කම්කරුවන්
2. ශිෂ්‍යයන්
3. ගොවියන්
4. රෝගීන්

31) ගුරුවරු ශිෂ්‍ය ශිෂ්‍යාවන් _____ යවති.

1. නොමග
2. යහමග
3. පෙරට
4. ගෙදරට

32) ශ්‍රී ලාංකිකයෝ ජයග්‍රාහී ක්‍රිකට් ක්‍රීඩකයන් _____ හරපරින් පිළිගත්හ.

1. ප්‍රීතියෙන්
2. ප්‍රවේශමෙන්
3. හරපරින්
4. හදිසියෙන්

33) උද්යෝගයෙන් කටයුතු කළ _____ මේ කන්නයේ සරු අස්වැන්නක් ලැබුහ.

1. ආදිවාසීහු
2. ප්‍රදේශවාසීහු
3. ගොවීහු
4. නිලධාරීහු

34) තම රජයේ _____ වූයේ සංවර්ධන ඉලක්කය ජය ගැනීමය.

1. පරීක්ෂාව
2. උපේක්ෂාව
3. අපේක්ෂාව
4. ආරක්ෂාව

35) ජාතික පොදු උරුමයන් _____ කිරීම අප සැමගේ යුතු කමකි.

1. පරිහරණය
2. පරිභෝජනය
3. සංරක්ෂණය
4. ආකර්ෂණය

APPENDIX F

Sinhala Word Structure Test

සිංහල පද විචාරය හා සම්බන්ධ පරීක්ෂණය

1	දුර	අදුර	ඔව්	නැත
2	තොට	තොටියෝ	ඔව්	නැත
3	ප්‍රයෝජන	ප්‍රයෝජනවත්	ඔව්	නැත
4	කලා	කලාතුරකින්	ඔව්	නැත
5	කාන්තා	කාන්තාවෝ	ඔව්	නැත
6	සඳ	සඳහා	ඔව්	නැත
7	විද්‍යා	විද්‍යාලය	ඔව්	නැත
8	මිහිරි	ඉමිහිරි	ඔව්	නැත
9	දරු	දරුවනි	ඔව්	නැත
10	මව	මවනවා	ඔව්	නැත
11	පැවිදි	උපැවිදි	ඔව්	නැත
12	උපාධි	උපාධිධරයන්	ඔව්	නැත
13	නීති	අධිනීතිඥ	ඔව්	නැත
14	ඉර	ඉරුණු	ඔව්	නැත
15	පැමිණෙයි	සපැමිණෙයි	ඔව්	නැත
16	පෙම්	පෙම්වතෙක්	ඔව්	නැත
17	සැදැහැ	සැදැහැයෙන්	ඔව්	නැත
18	යක්	බෙරයක්	ඔව්	නැත
19	අවසාන	අවාසනාවන්තයෙක්	ඔව්	නැත
20	හිරි	මිහිරි	ඔව්	නැත
21	මන	මනමාල	ඔව්	නැත
22	ගම	ගැමියෙක්	ඔව්	නැත
23	දවස්	දවසක්	ඔව්	නැත

24	සිහින	සිහින්	ඔව්	නැන
25	දොර	දොරවල්	ඔව්	නැන
26	පූර්ණ	සම්පූර්ණ	ඔව්	නැන
27	බෙදුම්	බෙදුම්වාදීහු	ඔව්	නැන
28	ආරාධනා	සමාරාධනා	ඔව්	නැන
29	ඇත්ත	ඇත්තු	ඔව්	නැන
30	සිත	සිතමින්	ඔව්	නැන
31	පොත	පොතක්	ඔව්	නැන
32	හර	හරකා	ඔව්	නැන
33	කඩු	කඩුල්ල	ඔව්	නැන
34	මිනිස්	මිනිසෙකුට	ඔව්	නැන
35	ප්‍රමාණ	අවප්‍රමාණ	ඔව්	නැන
36	නම	නැමුණු	ඔව්	නැන
37	දිරිය	දිරිමත්	ඔව්	නැන
38	මිණි	මිණිමුවා	ඔව්	නැන
39	තුන	තුනට්	ඔව්	නැන
40	උදාර	උදාරතම	ඔව්	නැන
41	ඩිපෝ	ඩිපෝවක්	ඔව්	නැන
42	නාග	නාගරික	ඔව්	නැන
43	සාහිත්‍ය	සාහිත්‍යධරයන්	ඔව්	නැන
44	පුත්	පුනණුවො	ඔව්	නැන
45	සුභද	සුභදතා	ඔව්	නැන
46	දිය	දියබ	ඔව්	නැන
47	කර	කරුමය	ඔව්	නැන
48	රක්	රකින්නා	ඔව්	නැන
49	අත්	අත්තම්	ඔව්	නැන
50	දරු	දරුණු	ඔව්	නැන
51	නර	නරඹන්නෙහි	ඔව්	නැන
52	නිල්	නිලුපුල්	ඔව්	නැන

53	අරුණ	අරුණඌ	ඔව්	නැත
54	හර	හරවනවා	ඔව්	නැත
55	අවකාශ	අභ්‍යවකාශ	ඔව්	නැත

APPENDIX G

Sinhala Morpho-Syntactic Structure Test

සිංහල වාක්‍යයන් හි පද භාවිතය හා සම්බන්ධ පරීක්ෂණය

- 1) අපි එයා ප්‍රිය
a) කරමි b) කරනු c) කරන්නෙමු d) කරති
- 2) නිදහස් නිවහල් දිවියක් ගෙවයි.
a) ගැමියන් b) ගැමියෝ c) ගැමියා d) ගැමියාගෙන්
- 3) හබල අතට ගත්තේය.
a) නොවියෝ b) නොවියාන c) නොවියෙක් d) නොවියනි
- 4) ළමයා විසින් පුවත්පත්ය.
a) බලයි b) බලනුයේ c) බැලෙනුයේ d) බලන්නේ
- 5) ගවයන් රකිති.
a) ගොවියන් b) ගොවියා c) ගොවියෝ d) ගොවි
- 6) උදෑසන ම පාසලට පැමිණෙති.
a) බාලිකාවියන් b) බාලිකාවන් c) බාලිකා d) බාලිකාවෝ
- 7) දෙමාපියෝ යහමග යවති.
a) දරුවෝ b) දරුවනට c) දරුවන් d) දරු
- 8) සභාපතිතුමා අමතයි.
a) සාමාජික b) සාමාජිකයනට c) සාමාජිකයන් d) සාමාජිකයෝ
- 9) පාලකයා කැඳවී ය.
a) සේවකයෝ b) සේවකයා c) සේවකයන් d) සේවක
- 10) විසින් භාණ්ඩ මිල දී ගැනෙයි/ගනුලබයි.
a) පාරිභෝගිකයා b) පාරිභෝගිකයන් c) පාරිභෝගිකයෝ d) පාරිභෝගික
- 11) ලොව අලංකාර වෙයි.
a) මල්වලට b) මල c) මලකට d) මල්වලින්

- 12) නිමල් ගමට ගියේ ය.
- a) දුම්රියෙහි b) දුම්රියට c) දුම්රියෙන් d) දුම්රියේ
- 13) පොත් අගය කරමු.
- a) ලේඛකයන්ගේ b) ලේඛකයෝ c) ලේඛකයන්ගේ d) ලේඛක
- 14) කකුල් අබලන් ය.
- a) පුටුව b) පුටුවෙහි c) පුටුවලට d) පුටුවේ
- 15) ශිෂ්‍යයයෝ පත්ති ඉගෙන ගනිති.
- a) කාමරයෙන් b) කාමරයට c) කාමරයෙහි d) කාමර
- 16) ඇය මෙන් රුමන් ය.
- a) දෙවඟනක් b) දෙවඟනන් c) දෙවඟනක d) දෙවඟනක්ය
- 17), යහ වැඩෙහි යෙදෙන්න.
- a) මිනිසුන් b) මිනිසුනි c) මිනිස්සු d) මිනිස්
- 18) අධ්‍යක්ෂකවරයා විසින් පත් කෙරෙති.
- a) ගුරුවරුන් b) ගුරුවරු c) ගුරුවරයාගෙන් d) ගුරු
- 19) විසින් හඬ පාලනය කරන ලදී.
- a) නිවේදකයන් b) නිවේදකයෝ c) නිවේදකයා d) නිවේදක
- 20) දරුවෝ ක්‍රිකට් ක්‍රීඩා
- a) කරති b) කරමු c) කරයි d) කරවයි
- 21) ගායකයෝ සතුවට පත් කළහ.
- a) රසිකයෝ b) රසිකයන්ගේ c) රසිකයාගේ d) රසිකයන්
- 22) නිදෙනෙක් විශිෂ්ට සම්මාන හිමි කර ගත්හ.
- a) සිසුන් b) සිසුන්ට c) සිසුන්ගේ d) සිසුහු
- 23) '..... පහර දෙතියි' පාලකයෝ බිය වූහ.
- a) සතුරෝ b) සතුරන් c) සතුරන්ගේ d) සතුරු
- 24) සොරුන් පලවා හරිති.
- a) මුරකරුවන් b) මුරකරුවනි c) මුරකරුවෝ d) මුරකරු
- 25) විභාගයට සූදානම් වී ඇත.
- a) අපේක්ෂකයෝ b) අපේක්ෂකයා c) අපේක්ෂකයන් d) අපේක්ෂක

- 26) ගුරුවරු ද ද රැස්වීමට ආහ.
- a) ශිෂ්‍යයා b) ශිෂ්‍යයන් c) ශිෂ්‍ය d) ශිෂ්‍යයෝ
- 27) වෛද්‍යවරයා සුවපත් කරයි.
- a) රෝගීන් b) රෝගී c) රෝගියෝ d) රෝගීහු
- 28) ගොවියන් සමග ද කුඹුරු වපුරති.
- a) ගෙවිලිය b) ගෙවිලියන් c) ගෙවිලියෝ d) ගෙවිලියන්ගේ
- 29) අපි යහපත් සේ හැසිරෙමු.
- a) මිනිස්සු b) මිනිසා c) මිනිස් d) මිනිසුන්
- 30) නුඹලා සැදුවෙහු.
- a) ගෙය b) ගෙයි c) ගෙයක් d) ගෙයක
- 31) දරුවන් යහමග යවති.
- a) මවුපියන් b) මවුපියෝ c) මවුපිය d) මවුපියන්ගේ
- 32) විසින් රෝගීහු සුවපත් කරනු ලබති.
- a) වෛද්‍ය b) වෛද්‍යවරයා c) වෛද්‍යවරුන් d) වෛද්‍යවරයාගෙන්
- 33) ගුරුවරුන් විසින් යහමග යැවෙති/යවනු ලැබෙති.
- a) සිසු b) සිසුවන් c) සිසුවෝ d) සිසුහු
- 34) විනිසුරුතුමා නිදහස් කළේය.
- a) මුදිතයන්ගේ b) මුදිතයන් c) මුදිතයට d) මුදිත
- 35) සංගමයේ බලාපොරොත්තු වන්නේ මොනවා ද?
- a) සාමාජිකයන් b) සාමාජිකයෝ c) සාමාජික d) සමජිකයගෙන්
- 36) ඇතැම් පාඩම් අත් හරිනු ඇත.
- a) ගුරුවරයෝ b) ගුරුවරයන් c) ගුරුවරුන් d) ගුරු
- 37) ගොවියන් විසින් බැඳෙති.
- a) ගවයන් b) ගවයා c) ගවයෝ d) ගව
- 38) වර්තමානය වන විට සමස්ත ලෝකයම තාක්ෂණයට අවනත වී ඇත.
- a) පරිඝණකයෙන් b) පරිඝණකය c) පරිඝණක d) පරිඝණකමය
- 39) ඔවුන්ගේ ආරවුල් සමථ මණ්ඩලය විසින් ලදී.
- a) විසදනවා b) විසදන c) විසදීම d) විසදන්නා

- 40) නංගි පිහිනල ගල ගාමින් ඒවා මුවහත් වැයම් කළාය.
- a) කරන්නා b) කර c) කරයි d) කරන්නට
- 41) වැසි ගඟ ගලාවේ.
- a) වැස්ස b) වැස්සෙන්න c) වැස්සට d) වැස්සෙන්
- 42) තරු පෙළ සඳ වටා පැවතීම.
- a) බබළමින් b) බබළී c) බබළීම d) බබළෙයි
- 43) මිනිසා විසින් ගස
- a) කපයි b) කැපේ c) කපන d) කපන්නා
- 44) හිගන්නා මගෙන් රුපියලක්
- a) ඉල්ලනවා b) ඉල්ලී c) ඉල්ලම d) ඉල්ලමින්
- 45) ඇය ඉදිරිපත් කළ කාගේත් සිත් ගත්තේය.
- a) ගැයුමෙන් b) ගායනය c) ගයන්නා d) ගැයුමෙනි
- 46) යුවතිය සිය වරලස විදහාගෙන විනිශ්චය මණ්ඩලය හමුවට පැමිණියාය.
- a) රූ b) රූමතියක c) රූමතීන් d) රූමත්
- 47) කලා උලෙළ සඳහා දැරිය ඉදිරිපත් කළ කාගේත් සිත් ගත්තේය.
- a) නටනවා b) නැටුමෙන් c) නැටුම d) නැට්ටුවා
- 48) කුඹුරුයාගේ ගොයම් සඳහා ගමේ තරුණ තරුණියෝ ද පැමිණියහ.
- a) කපනවා b) කපන්නන් c) කැපීමේ d) කැපීම
- 49) වැඩිහිටියන්ගේ බාල පරපුර සිතට ගත යුතුය.
- a) කියූ b) කීම c) කියන්නා d) කියමත්
- 50) ශිෂ්‍යයා හොඳින් පිළිතුරු පෙනෙයි.
- a) ලියනු b) ලියන c) ලියනවා d) ලියන්නා
- 51) කම්කරුවා බිමට බසී.
- a) වහලයේ b) වහලයෙන් c) වහලයෙනි d) වහලය
- 52) අවට සෞන්දර්යය ඔහු හදිසියේ ම දේවතා ඵළියක් දුටුවේ ය.
- a) නරඹනවා b) නැරඹු c) නරඹන d) නරඹන්නා
- (53) ළමයි වතුරට සෙල්ලම් කළහ.
- a) පනිනවා b) පැනීම c) පනින d) පනිමින්

- 54) ගොවියෝ ගොයම් කමතට අදිති.
- a) කපනවා b) කපා c) කපන්නා d) කපන
- 55) ළමයි කෑ ගසති.
- a) සතුටේ b) සතුටින් c) සතුට d) සතුටු
- 56) මුවෝ තැනී ගනිති.
- a) බියට b) බියෙන් c) බියේ d) බිය
- 57) ඇ මා දෙස මම සිතාසුණෙමි.
- a) බලන්නා b) බලද්දී c) බලා d) බලන
- 58) මාවන් වික්‍රමසිංහ විශිෂ්ට වෙයි.
- a) ලේඛකයා b) ලේඛක c) ලේඛකයෙක් d) ලේඛනයෙන්
- 59) ඔවුන්ගේ ආරවුල් සමථ මණ්ඩලය විසින් ලදී.
- a) විසදනවා b) විසදන c) විසදීම d) විසදන්නා
- 60) ලංකාවේ පැරණි නිර්මාණ අභිමානවත් ඉතිහාසයකට සාක්ෂි
- a) සපයන්නා b) සපයන c) සපයමින් d) සපයයි
- 61) ගුරුවරයා හොඳින් පෙනේ.
- a) උගන්වනවා b) උගන්වන්නා c) උගන්වනු d) උගන්වන
- 62) ශිෂ්‍යයෝ දැල්පන්දු ක්‍රීඩා
- a) කරනු b) කරන්නා c) කරන d) කරති
- 63) රියදුරාට පාලනය කර ගත නොහැකි විය.
- a) වේගය b) වේගයෙන් c) වේග d) වේගයට
- 64) නිෂ්පාදන ඉලක්ක සපුරා ගැනීම සඳහා ක්‍රියා කළ යුතුය.
- a) උද්යෝගය b) උද්යෝගයෙන් c) උද්යෝගී d) උද්යෝගීමත්
- 65) සභාපතිතුමා අනුමන්ඩලයට පත් කරයි.
- a) සාහිත්‍ය b) සාහිත්‍යධරයන් c) සාහිත්‍යයෙන් d) සාහිත්‍යමය
- 66) අපි ඒ මනස්කාන්ත වසඟ වීමු.
- a) දර්ශනය b) දර්ශනීය c) දර්ශනයෙන් d) දර්ශන
- 67) ක්‍රිකට් කණ්ඩායම් සතුටු වුණු ක්‍රීඩකයෝ ඔල්වරසන් දුන්හ.
- a) ජයග්‍රහණය b) ජයග්‍රාහී c) ජයග්‍රහණයෙන් d) ජයගෙන

68) ඔහු පාරේ ගමන් දෙස බලා සිටියි.

- a) කරන b) කරන්නා c) කර d) කරයි

69) ගුරුතුමිය සිඟින්නාට මල් කිනිත්තක් තෑගි කළාය.

- a) අලංකාරය b) අලංකාරයෙන් c) අලංකාර d) අලංකාරයි

70) ගුරුවරු උදෑසනම පාසලට

- a) පැමිණෙයි b) පැමිණෙති c) පැමිණ d) පැමිණීම

APPENDIX H

Sinhala Size of Vocabulary Test

සිංහල වචන ප්‍රමාණය හා සම්බන්ධ පරීක්ෂණය

(1)

- 1 අත්තිකාරම
- 2 උපහරණ නිදසුන් _____
- 3 කලාකෘති පෙරකතාව _____
- 4 කුටුම්භය ඉතිරි වූ දේවල් _____
- 5 නෂ්ටාවශේෂ
- 6 පුරාවෘත්තය

(2)

- 1 අනන්‍යතාවය
- 2 කුතුහලය පුද්ගලයා _____
- 3 ලාභය නොවෙනස් බව _____
- 4 වරප්‍රසාද විශේෂ අයිති වාසිකම _____
- 5 සම්ප්‍රදාය
- 6 සෑකය

(3)

- 1 අභිප්‍රාය
- 2 අභියෝගය ඉලක්කය _____
- 3 ධෛර්යය තේරුම _____
- 4 නිර්වචනය ශක්තිය _____
- 5 රුචිකත්වය
- 6 විවරණය

(4)

- 1 ඇදෙනවා
- 2 උසිගන්වනවා මතුකරනවා _____
- 3 කුළුගන්වනවා උදව් කරනවා _____
- 4 දක්වනවා හොයල බලනවා _____
- 5 පිරික්සනවා
- 6 පොළඹවනවා

(5)

- 1 අනුක්‍රමය
- 2 අව්‍යාජ නියම _____
- 3 උත්කෘෂ්ට උසස් _____
- 4 ක්‍රමවත් දක්ෂ _____
- 5 විදග්ධ
- 6 විශාල

(6)

- 1 අමන්දානන්දය
- 2 ගවේෂණය සොයා බැලීම _____
- 3 තත්කාලීන විශාල සතුටක් _____
- 4 ප්‍රවණතාව යමකට ඇති ලැදියාව _____
- 5 විමර්ශනය
- 6 භාෂෙයාත්පාදනය

(7)

- 1 අනාගතය
- 2 අනාවැකිය සීමාව _____
- 3 උච්චාවචනය වෙනස්වීම _____
- 4 ප්‍රගමනය ඉදිරියට යාම _____
- 5 ව්‍යසරිය
- 6 සාර්ථකත්වය

(8)

- 1 අනිරික්ත
- 2 කෘත්‍රීම ලොකු _____
- 3 දීර්ඝකාලීන යහපත් _____
- 4 නිශ්චල අධික _____
- 5 විප්‍රල
- 6 ශෝර්ෂ්ඨ

(9)

- 1 අඛණ්ඩ
- 2 ප්‍රචලිත ස්ථිර _____
- 3 නිරසාර අපහැදිලි _____
- 4 නිදන්ගත වෙන් වූ _____
- 5 විපරීත
- 6 ස්වතන්ත්‍ර

(10)

- 1 අනුභූතිය
- 2 ප්‍රතිභාව අත්දැකීම _____
- 3 බහුශ්‍රුත උපන් හැකියාව _____
- 4 විභවය දියුණුකළ හැකි _____
- 5 යථාතත්වය
- 6 ස්වභාවය

(11)

- 1 ආත්මාභිමානය
- 2 කීර්තිය වහල්බව _____
- 3 නිරූපණය උසස් හැඟීම _____
- 4 පරාධීනත්වය පෙන්නුම් කිරීම _____
- 5 ප්‍රේමචන්ද්‍රිය
- 6 සන්දර්භනය

(12)

- 1 ආබාධ
- 2 උත්සවය ගොඩක් _____
- 3 දොනය හපන් කම _____
- 4 පරිසරය අවහිරයක් නැති _____
- 5 සම්භාරය
- 6 විද්‍යානය

(13)

- 1 අවශේෂ
- 2 උභතෝකෝටික දැනුවත් _____
- 3 මනෝමූලික පාවිච්ඡි කරන _____
- 4 ව්‍යවහාරික සිතාගත නොහැකි _____
- 5 නිරර්ථක
- 6 සවිද්‍යානක

(14)

- 1 අභවනවා
- 2 උකහනවා ඉල්ලනවා _____
- 3 නගනවා විමසනවා _____
- 4 යදිනවා එකතුකරනවා _____
- 5 විදහපානවා
- 6 සොයනවා

(15)

- 1 අධීක්ෂණය
- 2 අභිමතාර්ථය අදහස _____
- 3 උපයෝගීතාවය ආරම්භය _____
- 4 ප්‍රභවය නොපෙනෙන හැකියාව _____
- 5 ශක්‍යතාව
- 6 විභවතාව

(16)

- 1 අභිභවනවා
- 2 උසුලනවා පෙන්නවනවා _____
- 3 එළඹෙනවා පසුකරනවා _____
- 4 එළිදක්වනවා පාලනයකරනවා _____
- 5 නිගැස්සෙනවා
- 6 මැඩපවත්වනවා

(17)

- 1 අභිලාෂය
- 2 උද්ධමනය ආශාව _____
- 3 චිත්තාවේග මනක් කිරීම _____
- 4 ප්‍රත්‍යාවේක්ෂණය අත්‍රිත සහ බොරුව _____
- 5 භාවනාව
- 6 සත්‍යාසත්‍යතාව

(18)

- 1 අත්භූත
- 2 නෛසර්ගික මූලික _____
- 3 පෙරදිග නොසෙල්වෙන _____
- 4 ප්‍රාග්ධන උපනිත් ලැබුණු _____
- 5 භාවපූර්ණ
- 6 ස්ථායී

(19)

- 1 අතීතාවර්ජනය
- 2 තාවුල්ල කෙළවර _____
- 3 ප්‍රතිශෝධනය පැටලිල්ල _____
- 4 විශුක්තිය අනුමත නොකිරීම _____
- 5 විරසකය
- 6 සංකූලතාව

(20)

- 1 කැසකවනවා
- 2 මතුකරනවා පතුරුවනවා _____
- 3 මෙහෙයවනවා උත්සහ කරනවා _____
- 4 විහිදුවනවා නැතිකරනවා _____
- 5 වලකාලනවා
- 6 සංසිදුවනවා

(21)

- 1 අධිමානය
- 2 අර්ථශාස්ත්‍රය මහන්සිය _____
- 3 සරතැස හැකියාව _____
- 4 සාමාර්ථය මුදල් හා සම්බන්ධ _____
- 5 සංවේදනය
- 6 භීතමානය

(22)

- 1 උපමානය
- 2 තුලනය වටිනාකම් _____
- 3 පුරුෂාර්ථ එකඟතාවය _____
- 4 මුඛාර්ථ සමානත්වය _____
- 5 සමරූපතාව
- 6 සම්මුතිය

(23)

- 1 අනාත්වික
- 2 ප්‍රතාපවත් ඉතා පැහැදිලි _____
- 3 යථාර්ථවාදී පිළිගත් නොහැකි _____
- 4 වයෝවෘද්ධ මහත් අලංකාරයෙන් යුත් _____
- 5 විනිවිද
- 6 විමධ්‍යගත

(24)

- 1 අනභිභවනීය
- 2 අවිඥානික උසස් _____
- 3 පරිකල්පන හිතන්නේ නැති _____
- 4 ප්‍රශස්ත නොදැනුවත්ව _____
- 5 මුග්ධ
- 6 විස්මයජනක

(25)

- 1 උද්ග්‍රහණය
- 2 නිෂේධනය අවබෝධය _____
- 3 ප්‍රඥාව පරිසිද්ධ කිරීම _____
- 4 ඩැහැගැනීම තදින් අල්ලා ගැනීම _____
- 5 විජානනය
- 6 විශෝධනය

(26)

- 1 අනුයෝජිත
- 2 අවියෝජනීය වෙනත් _____
- 3 පරතන්ත්‍ර අනුන්ට අයත් _____
- 4 පරාර්ථකාමී බෙදා වෙන් කළ නොහැකි _____
- 5 විශුක්ත
- 6 වෛකල්පිත

(27)

- 1 අනුප්‍රාසය
- 2 උත්ප්‍රාසය හැකියාව _____
- 3 උපයෝජනය සූරා කෑම _____
- 4 ඔෆ්විතාය ශබ්ද අලංකාරය _____
- 5 ග්‍රහණය
- 6 නෛපුණය

APPENDIX I

Sinhala Depth of Vocabulary Test

සිංහල වචන ආශ්‍රිත අර්ථය සහ වචන පිළිවෙල සම්බන්ධ පරීක්ෂණය

1. වාසනාවන්ත

<input type="checkbox"/> රමණීය	<input type="checkbox"/> ප්‍රබල	<input type="checkbox"/> පොත	<input type="checkbox"/> ජීවිතය
<input type="checkbox"/> අනිවිසාල	<input type="checkbox"/> සමෘද්ධිමත්	<input type="checkbox"/> කාලය	<input type="checkbox"/> අනාගතය

2. නවීන

<input type="checkbox"/> අලුත්	<input type="checkbox"/> අභිනව	<input type="checkbox"/> විද්වතා	<input type="checkbox"/> පිරිහීම
<input type="checkbox"/> නරුම	<input type="checkbox"/> නව්‍ය	<input type="checkbox"/> විද්‍යාව	<input type="checkbox"/> දායාදය

3. නිර්මල

<input type="checkbox"/> ව්‍යාකූල	<input type="checkbox"/> පවිත්‍ර	<input type="checkbox"/> අනවරය	<input type="checkbox"/> ක්‍රමය
<input type="checkbox"/> අමිශ්‍ර	<input type="checkbox"/> නගරාශ්‍රිත	<input type="checkbox"/> ප්‍රේමය	<input type="checkbox"/> බුදුදහම

4. ඉසුරුමත්

<input type="checkbox"/> ප්‍රධාන	<input type="checkbox"/> අනර්ඝ	<input type="checkbox"/> ප්‍රවාහනය	<input type="checkbox"/> පැතිකඩ
<input type="checkbox"/> කාරුණික	<input type="checkbox"/> ධනවත්	<input type="checkbox"/> අනාගතයක්	<input type="checkbox"/> දිවයින

5. ප්‍රසන්න

<input type="checkbox"/> ප්‍රියංකර	<input type="checkbox"/> රම්‍ය	<input type="checkbox"/> අයබදු	<input type="checkbox"/> උවමනාව
<input type="checkbox"/> අපහසු	<input type="checkbox"/> කදිම	<input type="checkbox"/> අර්ථකථනය	<input type="checkbox"/> මුහුණ

6. කාර්යක්ෂම

<input type="checkbox"/> ප්‍රථම	<input type="checkbox"/> ක්‍රියාශූර	<input type="checkbox"/> භාෂාව	<input type="checkbox"/> බෙදාහැරීම
<input type="checkbox"/> නැවත	<input type="checkbox"/> දක්ෂ	<input type="checkbox"/> සේවාව	<input type="checkbox"/> විෂය

7. උපායශීලී

<input type="checkbox"/> නුවණක්කාර	<input type="checkbox"/> විදග්ධ	<input type="checkbox"/> තීරණය	<input type="checkbox"/> පුද්ගලයා
<input type="checkbox"/> ප්‍රයෝජනවත්	<input type="checkbox"/> බහුල	<input type="checkbox"/> ප්‍රදේශය	<input type="checkbox"/> අවතීන්ද්‍ර

8. භාසාප්පනක

<input type="checkbox"/> ප්‍රියජනක	<input type="checkbox"/> ගොදුරුවන	<input type="checkbox"/> නාට්‍යය	<input type="checkbox"/> සිදුවීම
<input type="checkbox"/> නිර්භය	<input type="checkbox"/> කවච	<input type="checkbox"/> උත්තරය	<input type="checkbox"/> ගොදුර

9. තීක්ෂණ

<input type="checkbox"/> සම්පූර්ණ	<input type="checkbox"/> නිපුණ	<input type="checkbox"/> විෂය	<input type="checkbox"/> ව්‍යාපාරිකයා
<input type="checkbox"/> ප්‍රබෝධමත්	<input type="checkbox"/> නියුණු	<input type="checkbox"/> බුද්ධිය	<input type="checkbox"/> නිදහස.

10. මිලේච්ඡ

<input type="checkbox"/> සහාසික	<input type="checkbox"/> ඒකාබද්ධ	<input type="checkbox"/> ප්‍රයෝගය	<input type="checkbox"/> ප්‍රහාරය
<input type="checkbox"/> උපහාසාත්මක	<input type="checkbox"/> සමාජ	<input type="checkbox"/> හැසිරීම	<input type="checkbox"/> ත්‍රස්ථවාදය

11. සංකීර්ණ

<input type="checkbox"/> පුද්ගලික	<input type="checkbox"/> මිශ්‍ර	<input type="checkbox"/> සමාජය	<input type="checkbox"/> ක්‍රියාවලිය
<input type="checkbox"/> බොහෝ	<input type="checkbox"/> නීතිමය	<input type="checkbox"/> නවකතාව	<input type="checkbox"/> අභිමතාර්ථය

12. නිර්මාණාත්මක

<input type="checkbox"/> යථාර්ථවාදී	<input type="checkbox"/> භිතුවක්කාර	<input type="checkbox"/> හැකියාව	<input type="checkbox"/> දෛවය
<input type="checkbox"/> උත්පාදක	<input type="checkbox"/> මවන	<input type="checkbox"/> අභියෝග	<input type="checkbox"/> අදහස්

13. ස්වර්ණමය

<input type="checkbox"/> අළුත්	<input type="checkbox"/> අගනා	<input type="checkbox"/> කාලය	<input type="checkbox"/> කෙටිකතාව
<input type="checkbox"/> මහඟු	<input type="checkbox"/> වැදගත්	<input type="checkbox"/> ස්වභාවය	<input type="checkbox"/> අවස්ථාව

14. නිරවද්‍ය

<input type="checkbox"/> නිදොස්	<input type="checkbox"/> නිවච	<input type="checkbox"/> ආවේගය	<input type="checkbox"/> ගණනය
<input type="checkbox"/> යෝග්‍ය	<input type="checkbox"/> පුරෝගාමී	<input type="checkbox"/> ප්‍රකාශය	<input type="checkbox"/> සම්මානය

15. ප්‍රෞරාණික

<input type="checkbox"/> ප්‍රායෝගික	<input type="checkbox"/> පුරාතන	<input type="checkbox"/> හැකියාව	<input type="checkbox"/> ඇඳුම
<input type="checkbox"/> කඩිසර	<input type="checkbox"/> පැරණි	<input type="checkbox"/> සම්ප්‍රදාය	<input type="checkbox"/> ස්ථාන

16. උචිත

<input type="checkbox"/> අදාළ	<input type="checkbox"/> ප්‍රසිද්ධ	<input type="checkbox"/> අවස්ථාව	<input type="checkbox"/> ප්‍රකාශය
<input type="checkbox"/> පූර්ව	<input type="checkbox"/> පැහැදිලි	<input type="checkbox"/> ආකෘතිය	<input type="checkbox"/> සත්‍යතාව

17. කෘතහස්ත

<input type="checkbox"/> ප්‍රවීණ	<input type="checkbox"/> වියළි	<input type="checkbox"/> ලේඛකයා	<input type="checkbox"/> භාෂාව
<input type="checkbox"/> පැතිරුණු	<input type="checkbox"/> ශ්‍රේණිගත	<input type="checkbox"/> නිර්මාණකරුවා	<input type="checkbox"/> සංගීතඥයා

18. භෞතික

<input type="checkbox"/> නිවැරදි	<input type="checkbox"/> පුළුල්	<input type="checkbox"/> සම්පත්	<input type="checkbox"/> අනාගතය
<input type="checkbox"/> ද්‍රව්‍යමය	<input type="checkbox"/> අවශ්‍ය	<input type="checkbox"/> ප්‍රකාශය	<input type="checkbox"/> දේපල

19. ස්ථාවර

<input type="checkbox"/> විමසිලිමත්	<input type="checkbox"/> නොසෙල්වන	<input type="checkbox"/> ප්‍රතිපත්ති	<input type="checkbox"/> නියෝග
<input type="checkbox"/> ස්ථායී	<input type="checkbox"/> නීතිමය	<input type="checkbox"/> අයිතිවාසිකම්	<input type="checkbox"/> දික්කසාදය

20. සම්ප්‍රදායික

<input type="checkbox"/> ආවේණික	<input type="checkbox"/> ක්‍රමානුකූල	<input type="checkbox"/> නර්තනය	<input type="checkbox"/> සාක්කිය
<input type="checkbox"/> ලෝකසම්මත	<input type="checkbox"/> ගතානුගතික	<input type="checkbox"/> දශකය	<input type="checkbox"/> ආලෝකය

21. ප්‍රාථමික

<input type="checkbox"/> පළමු	<input type="checkbox"/> විශේෂිත	<input type="checkbox"/> අධ්‍යාපනය	<input type="checkbox"/> අභියාචනය
<input type="checkbox"/> අසෞභන	<input type="checkbox"/> මූලික	<input type="checkbox"/> පාසල	<input type="checkbox"/> දේපල

22. ව්‍යවහාරික

<input type="checkbox"/> දෛර්යමත්	<input type="checkbox"/> ක්‍රියායෝග්‍ය	<input type="checkbox"/> අදහස්	<input type="checkbox"/> දැනුම
<input type="checkbox"/> ප්‍රධාන	<input type="checkbox"/> ප්‍රායෝගික	<input type="checkbox"/> පරමාර්ථය	<input type="checkbox"/> පුහුණුව

23. දුබල

<input type="checkbox"/> දුක්ඛිත	<input type="checkbox"/> ඉමහත්	<input type="checkbox"/> වර්ණය	<input type="checkbox"/> සාමය
<input type="checkbox"/> නියාලු	<input type="checkbox"/> බෙලහීන	<input type="checkbox"/> අවනම්බුව	<input type="checkbox"/> පුද්ගලයා

24. ප්‍රකට

<input type="checkbox"/> කීර්තිමත්	<input type="checkbox"/> මිත්‍යා	<input type="checkbox"/> ප්‍රඥාව	<input type="checkbox"/> උත්සාහය
<input type="checkbox"/> මැනවින්	<input type="checkbox"/> ප්‍රසිද්ධ	<input type="checkbox"/> කෘතිය	<input type="checkbox"/> නාට්‍යකරුවා

25. අස්වාභාවික

<input type="checkbox"/> අභිමානවත්	<input type="checkbox"/> අසාමාන්‍ය	<input type="checkbox"/> හැසිරීම	<input type="checkbox"/> වස්තුවක්
<input type="checkbox"/> නගරාශ්‍රිත	<input type="checkbox"/> දැඩිමනධාරී	<input type="checkbox"/> චරිතයක්	<input type="checkbox"/> අවබෝධයක්

26. නිශ්චල

<input type="checkbox"/> සන්සුන්	<input type="checkbox"/> නිමල	<input type="checkbox"/> දේපල	<input type="checkbox"/> ප්‍රබෝධය
<input type="checkbox"/> නිසල	<input type="checkbox"/> නිර්ධන	<input type="checkbox"/> දේහය	<input type="checkbox"/> පරීක්ෂාව

27. සක්‍රීය

<input type="checkbox"/> උද්යෝගී	<input type="checkbox"/> ක්‍රියාකාරී	<input type="checkbox"/> බලපෑම	<input type="checkbox"/> අත්වැල
<input type="checkbox"/> ප්‍රතාපවත්	<input type="checkbox"/> ස්වාධීන	<input type="checkbox"/> දායකත්වය	<input type="checkbox"/> නිදහස

28. නග්න

<input type="checkbox"/> විශාල	<input type="checkbox"/> හිස්	<input type="checkbox"/> සංකල්ප	<input type="checkbox"/> ප්‍රදේශය
<input type="checkbox"/> මුඩු	<input type="checkbox"/> ව්‍යාප්ත	<input type="checkbox"/> පිබිදීම	<input type="checkbox"/> කාන්තාව

29. සම්භාව්‍ය

<input type="checkbox"/> ශාස්ත්‍රීය	<input type="checkbox"/> උසස්	<input type="checkbox"/> සාහිත්‍යය	<input type="checkbox"/> අතරමංවීම
<input type="checkbox"/> බහුල	<input type="checkbox"/> අනිදක්ෂ	<input type="checkbox"/> චිත්‍රපටිය	<input type="checkbox"/> උරුමය

30. ප්‍රඥාවන්ත

<input type="checkbox"/> ගුණවත්	<input type="checkbox"/> නීත්‍යානුකූල	<input type="checkbox"/> තීරණය	<input type="checkbox"/> පුද්ගලයා
<input type="checkbox"/> නන්තාදුන්න	<input type="checkbox"/> බුද්ධිමත්	<input type="checkbox"/> යෝජනාව	<input type="checkbox"/> තනතුර

31. ක්ෂණික

<input type="checkbox"/> සාධාරණ	<input type="checkbox"/> හදිසි	<input type="checkbox"/> ප්‍රතිඵලය	<input type="checkbox"/> කෝපය
<input type="checkbox"/> සමස්ත	<input type="checkbox"/> මූලික	<input type="checkbox"/> වර්ධනය	<input type="checkbox"/> නිපුණතාව

32. සවිඥානක

<input type="checkbox"/> දැනුවත්	<input type="checkbox"/> අනුවිත	<input type="checkbox"/> සමාජය	<input type="checkbox"/> මිනිසා
<input type="checkbox"/> සවේනනික	<input type="checkbox"/> වැඩුණු	<input type="checkbox"/> නවීකරණය	<input type="checkbox"/> පන්දුව

33. අපූර්ව

<input type="checkbox"/> කුලැවි	<input type="checkbox"/> විශේෂ	<input type="checkbox"/> නිගමනය	<input type="checkbox"/> සොයාගැනීම
<input type="checkbox"/> තාක්ෂණික	<input type="checkbox"/> තාවකාලික	<input type="checkbox"/> නිර්මාණය	<input type="checkbox"/> සංවේගය

34. විධිමත්

<input type="checkbox"/> අවශ්‍ය	<input type="checkbox"/> යටිතල	<input type="checkbox"/> ආයෝජනය	<input type="checkbox"/> මානසිකත්වය
<input type="checkbox"/> නියම	<input type="checkbox"/> ක්‍රමවත්	<input type="checkbox"/> කේන්ද්‍රස්ථානය	<input type="checkbox"/> බඳවාගැනීම්

35. නිවහල්

<input type="checkbox"/> ස්වාධීන	<input type="checkbox"/> නොයිදුල්	<input type="checkbox"/> ජාතිය	<input type="checkbox"/> ප්‍රදේශය
<input type="checkbox"/> අපරාධීන	<input type="checkbox"/> ප්‍රසිද්ධ	<input type="checkbox"/> චෝදනාව	<input type="checkbox"/> රට

36. දූෂිත

<input type="checkbox"/> අපරිශුද්ධ	<input type="checkbox"/> අනාරක්ෂිත	<input type="checkbox"/> රචනය	<input type="checkbox"/> වෑයම
<input type="checkbox"/> වැරදි	<input type="checkbox"/> කිලිටි	<input type="checkbox"/> ආශ්වාදය	<input type="checkbox"/> ගණුදෙනුව

37. උදාසීන

<input type="checkbox"/> අලස	<input type="checkbox"/> ස්ථිර	<input type="checkbox"/> පුද්ගලයා	<input type="checkbox"/> ක්‍රමවේදය
<input type="checkbox"/> නිදහස්	<input type="checkbox"/> අකර්මණ්‍ය	<input type="checkbox"/> අපේක්ෂාව	<input type="checkbox"/> ආභාෂය

38. දුෂ්ට

<input type="checkbox"/> අයහපත්	<input type="checkbox"/> සාර්ථක	<input type="checkbox"/> බලවේග	<input type="checkbox"/> හැසිරීම
<input type="checkbox"/> බහුල	<input type="checkbox"/> නුසුදුසු	<input type="checkbox"/> උණුසුම්	<input type="checkbox"/> වාසිය

39. වමන්කාරජනක

<input type="checkbox"/> දැකුම්කලු	<input type="checkbox"/> විශාල	<input type="checkbox"/> කාලය	<input type="checkbox"/> අවස්ථාව
<input type="checkbox"/> පිරිසිදු	<input type="checkbox"/> දර්ශනීය	<input type="checkbox"/> වැටුප	<input type="checkbox"/> සිදුවීම

40. විකල්ප

<input type="checkbox"/> වෙනත්	<input type="checkbox"/> උද්දව්ව	<input type="checkbox"/> අනවරය	<input type="checkbox"/> තෝරාගැනීම
<input type="checkbox"/> උගත්	<input type="checkbox"/> වෛකල්පික	<input type="checkbox"/> අදහස්	<input type="checkbox"/> චෝදනාව